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PIT AND QUARRY

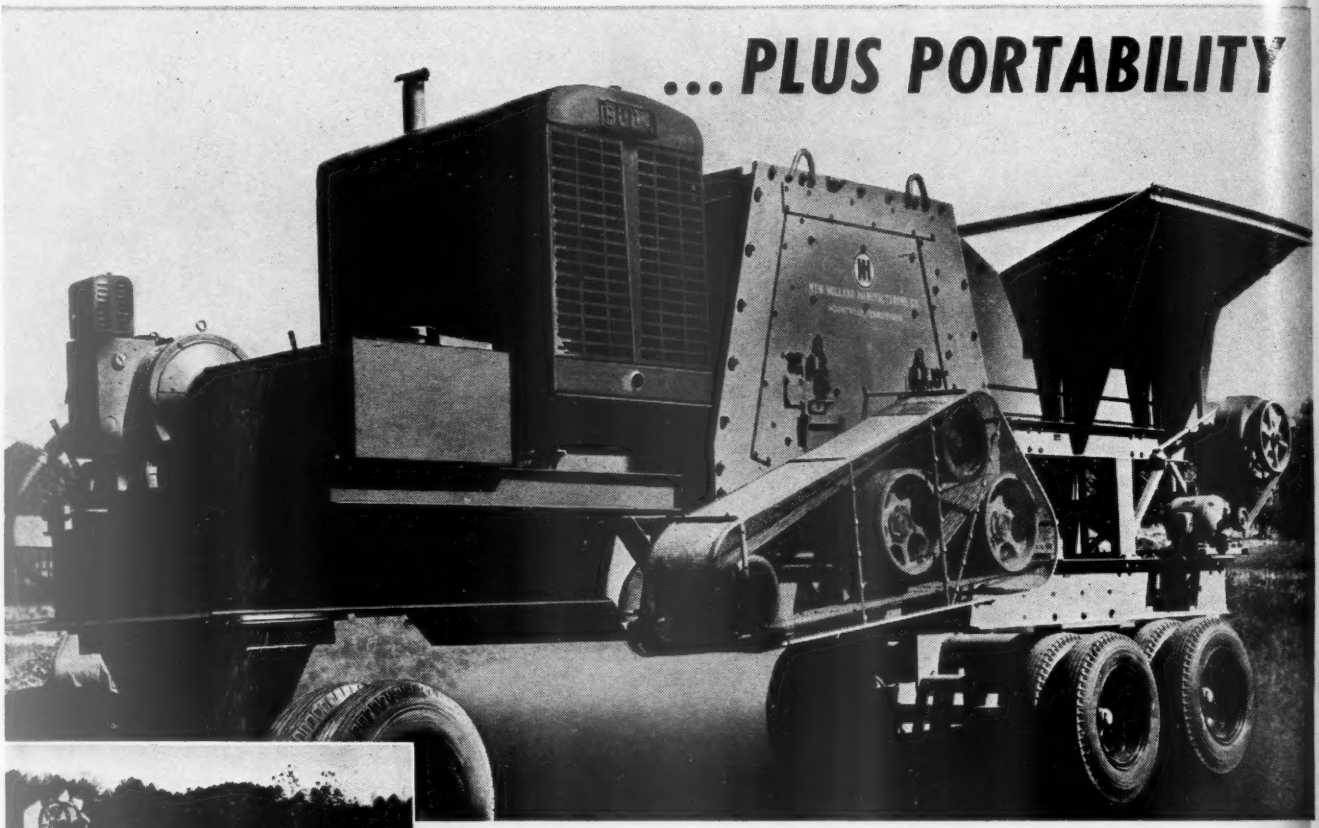
JANUARY 1947

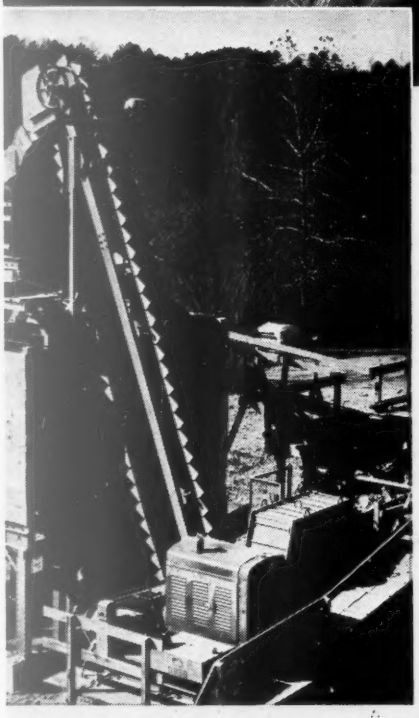
In this Issue

Reviews and Forecasts for the Non-Metallic Minerals Industries • Future Programs of the Highway and Building Construction Industries • Special Reviews of World-Wide Cement Developments, Conditions and Future Prospects.

PROVEN BREAKER PERFORMANCE

... PLUS PORTABILITY





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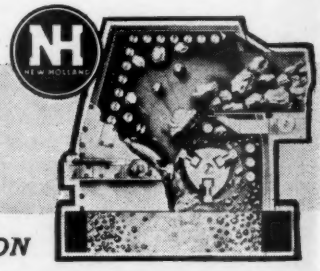

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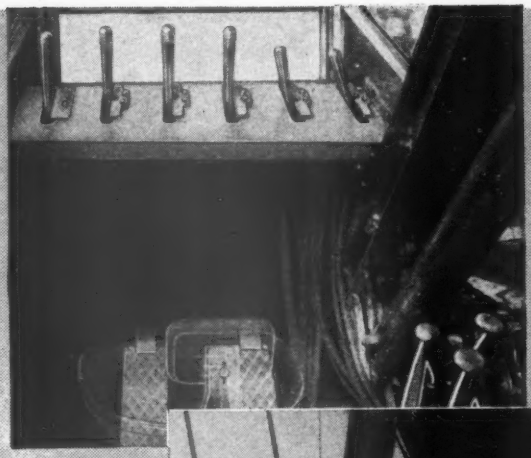

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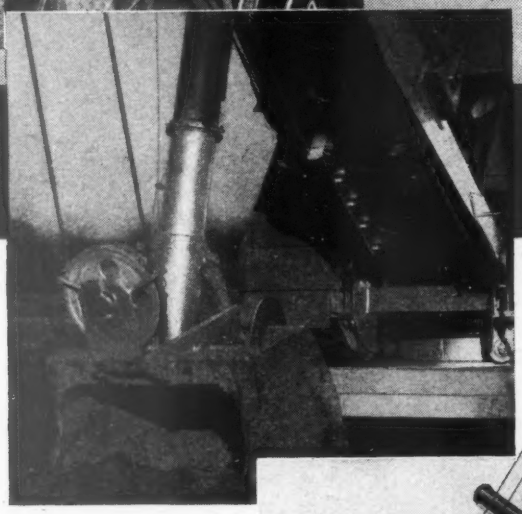

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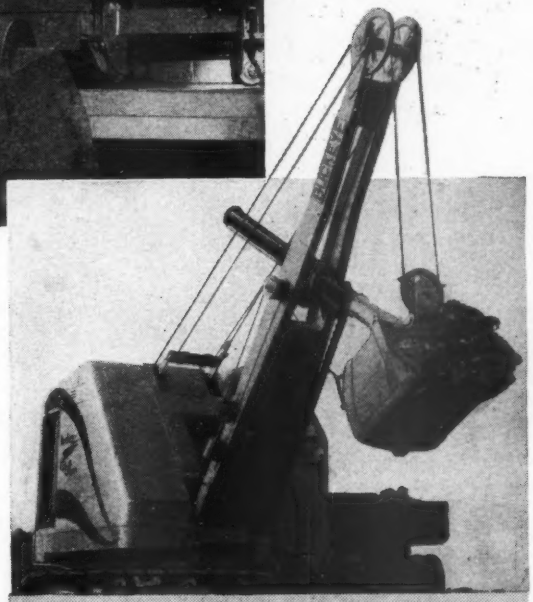

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PIT AND QUARRY

January, 1947

Vol. 39 No. 7

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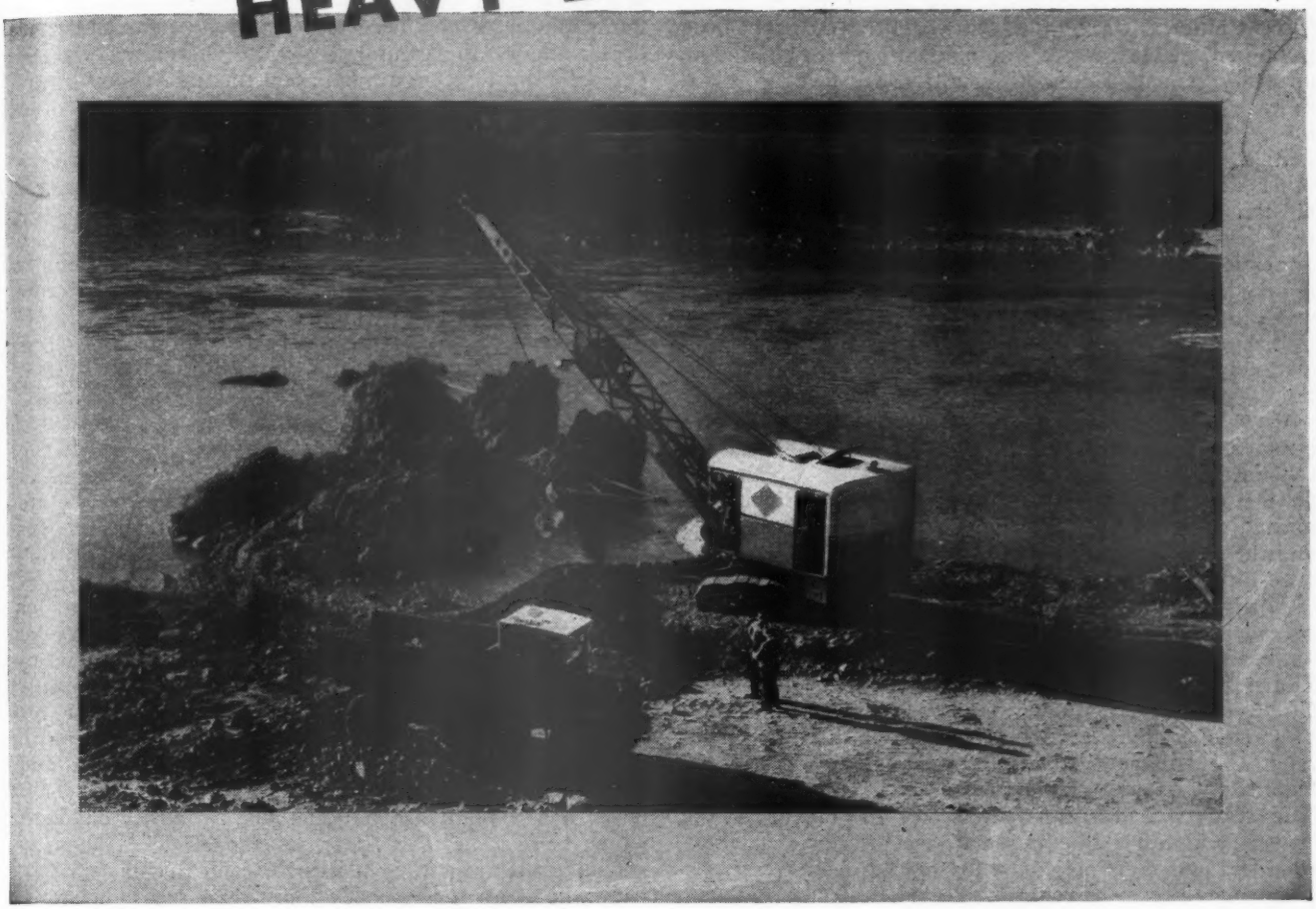

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EDITORIAL

The World Picture

A FEATURE of this issue of PIT AND QUARRY is what we believe to be the most complete compilation of information on the condition of the cement industry throughout the world that has ever been published. Every effort was made to get original data on every cement producing country and on every plant in each country. Returns were, as is always the case, incomplete in some categories but a vast amount of information was received which, combined with that from other sources, gives a general picture of conditions in enough countries to indicate general world conditions with fair accuracy. Special conditions in many countries or sections of countries are described, as are also developments by many individual companies.

We interpret this mass of information to show clearly that there is throughout the world a tremendous pent-up demand for cement and, of course, for the aggregates, lime, gypsum and other materials which inevitably go with it into construction. This demand is due to a number of reasons including: the vast and vital need for rebuilding and reconstruction in countries which suffered war damage; the tremendous pent-up demand for normal construction which was held up during the war; and the rapidly growing realization in many places of the need for higher living standards.

Much has been published, in these pages and elsewhere, on the tremendous amount of war damage in some countries, particularly in Russia, Germany, Poland, France, Great Britain, Belgium, the Netherlands, Italy, China and Japan. In many of these countries, and in some smaller ones not mentioned, it will take years to repair the damage done and to replace the bridges, dams, highways, factories, homes, etc., which were destroyed. This effort will take a large part of the output of the cement and other building material industries in these countries and their neighbors for years to come.

During the war years, as these articles point out, the countries at war were unable, for obvious reasons, to carry on more than a small percentage of the normal construction work which would ordinarily have been done. Those countries not directly affected by the war were in general better able to carry on their construction programs, but most of them also found it impossible to keep such work at a normal level. Most of them depended on imports in one way or another for the materials used in construction, or for the materials, equipment and supplies necessary to keep their cement and other industries operating at any reasonably high capacity.

The third reason given for the general boom building conditions throughout the world is more difficult to define. The term we used, "rapidly growing realization in many places of the need for higher living standards," does not give the complete picture. Actually, in many countries drastic steps are being taken, and in most others trends of thought are leading to similar steps, to speed up the development of these countries industrially and agriculturally. This involves the building of dams and irrigation systems, water and sewage disposal works, power plants, factories, highways, railroads, etc. In these countries, and in others already well developed along these lines, there is a growing awareness of the fact that homes and public recreational and other facilities are far below the standards in other countries. Even in the United States, where many of the native population as well as citizens of other nations think living standards are at a higher level than almost anywhere else, this is actually far from true. Whether through the movies, magazines, contacts with tourists before the war or servicemen during the war, there seems to be an overwhelming desire in all countries for a higher standard of living such as we are reported to have. This has resulted in a mounting demand for refrigerators, radios, automobiles, movie theaters and more and better homes.

All these things combined have created a demand for cement and allied materials which has reached boom proportions in many countries and this condition seems to be becoming world-wide. To all appearances, judging from the information received from all parts of the world, producers of cement are preparing for just such a boom by building new plants and improving and expanding existing operations. Countries which have never had a plant are building one or more; countries which have some plants but not enough to make them self-sufficient are adding plants to reach that goal; countries which are now already more than self-sufficient in this respect are expanding in order to export cement to less fortunate countries and to obtain desperately-needed foreign exchange.

Many of the important developments under way or definitely planned are described in this issue; on many others no definite information is yet available. In many other cases plans have been prepared but orders are not to be placed until the equipment situation stabilizes. It seems evident that manufacturers of equipment and supplies for the cement and allied industries are in for a good many years of peak demand.

The U. S. Picture

On the basis of information now available the prospects for the non-metallic minerals producing industries in the United States for 1947 and several succeeding years can only be regarded as highly favorable. Barring labor troubles far worse than ever before experienced, or some other as yet unforeseen major catastrophe, 1947 should be the biggest year in history for these industries.

According to authoritative sources industrial building construction in 1946 reached an all-time high, far exceeding the previous record volume of 1945. The backlog of proposed construction now on record alone is sufficient to keep industrial construction at the present record volume for several years to come. Residential construction is also at high and increasing volume and no end is in sight. Public construction is just starting to develop and should within a year or two approach earlier records. Details on construction programs are presented in this issue.

In spite of all handicaps the total value of all nonmetallic minerals other than fuels advanced 36 percent over 1945 to a total of $1,300,000,000. Increases in production were 60 percent for cement, 48 percent for sand and gravel, 25 percent for stone, and 45 percent for gypsum. New record sales volumes were set by the barite, feldspar, phosphate rock, potash, vermiculite and other industries. Only a few industries, and those of minor importance, showed no gain or slight losses.

ROCK PRODUCTS AND QUARRY

CHICAGO JANUARY, 1947

Carney Co.'s Expansion Program to Double Cement Output at Mankato Plant

Production from native Minnesota stone of materials urgently needed for the building of homes and for other construction will be greatly increased by The Carney Company, Inc., as the result of a $250,000 modernization and expansion program at its quarries and plant at Mankato, Minn., Harry E. Carney, Jr., president has announced.

The Carney Company, organized in 1883, manufactures and distributes rock wool insulation for industrial uses and home construction, natural cement for blended concrete in highway and other concrete construction, masonry cements and lime for building construction, and crushed stone products throughout the western half of the United States.

The company is spending $150,000 on its cement mill to modernize its huge quarries and stone crushing plant and to assure maximum production of cement from low-cost materials. These improvements will enable the company to double its cement producing capacity, which will reach 2,000 barrels per day after January 1.

In announcing the company's new program, Mr. Carney paid tribute to individuals and groups both from the Mankato community and statewide who supported its fight for recognition by the state highway department of blended cement in the construction of Minnesota highways.

Improvements in the insulation plant totalling nearly $100,000, including the installation of a new batt machine, will result in doubling the company's production of its Golden Fleece insulation batts. Approximately 50,000,000 square feet will be produced per year.

The Carney Company's several hundred acres of main quarry land comprise nearly 30,000,000 tons of stone, in addition to several smaller parcels aggregating some 10,000,000 tons.

American Mining Congress Forms Advisory Committee

The board of directors of the American Mining Congress has appointed a committee to advise Secretary of the Interior J. A. Krug of the mining industry's viewpoint on national mineral policies and on those activities of the Interior Department dealing with minerals. Special attention will be given to questions affecting mining operations on the public domain.

H. M. Albright, vice-president of the United States Potash Company of New York City, was named a member to represent the nonmetallic minerals industry. Secretary Krug requested that such a committee be formed when he addressed the fall meeting of the Western Division of the Mining Congress at Denver.

Coming Events

January 27-29, 1947 — Chicago. 30th annual convention, National Crushed Stone Association, Edgewater Beach Hotel. (No exhibits.)

January 27-30, 1947 — Chicago. 28th annual convention, Associated General Contractors of America, Inc., Stevens Hotel.

January 30-31, 1947 — Chicago. Second annual convention, Agricultural Limestone Division, National Crushed Stone Association, Edgewater Beach Hotel. (No exhibits.)

February 13-16, 1947—Chicago. Annual meeting, Associated Equipment Distributors, Edgewater Beach Hotel.

February 17-20, 1947—Chicago. Annual meeting, American Road Builders Association, Palmer House.

March 3-5, 1947—Los Angeles. 31st annual convention, National Sand & Gravel Association, Biltmore Hotel. (No exhibits.)

March 17-22, 1947—New York. 75th anniversary celebration, American Institute of Mining and Metallurgical Engineers, with World Conference on Mineral Resources, Waldorf-Astoria Hotel.

(For announcements concerning meetings of groups representing the concrete products and ready-mix industries, see page 191.)

Non-Housing Construction Still under Jurisdiction Of CPA, Builders Warned

Non-housing construction must still be authorized by the Civilian Production Administration under Veterans' Housing Program Order 1 (VHP-1), CPA has ruled. Although many other controls have been relaxed or revoked in recent weeks, the basic limitation order on non-residential construction is being continued for some months, in accordance with President Truman's housing statement.

This means that it is illegal to start construction on a store, a service station, a factory, a school, or any other commercial, industrial or institutional structure (except for certain small job exemptions) without authorization from CPA. CPA warned that, backed up by the President's mandate, it would continue to enforce Order VHP-1 vigorously.

All builders should check with the nearest CPA office if they have any questions about their right to go ahead with a non-housing construction project.

Similarly, all house and apartment construction must be authorized under the terms of VHP-1. No construction of this type (except for certain small job exemptions), may be started without approval by the Federal Housing Administration.

Reconverted Cement Plants Report Record Production

Two Buffalo, N. Y., cement plants, those of the Lehigh Portland Cement Company and the Federal Portland Cement Company, Inc., report that production is currently the highest in many years. Lehigh's four kilns and two at Federal are on a 24-hour schedule seven days a week.

Ronald E. Danels, secretary of the Federal Portland Cement Company stated that his plant's production is higher than at any time since 1930. A similar report was made by Jacob B. Zook, superintendent at Lehigh.

During World War II both plants were engaged in special work for the government. Lehigh made large quantities of lime, while the Federal facilities were used for processing iron ore for direct charging into open-hearth steel furnaces.

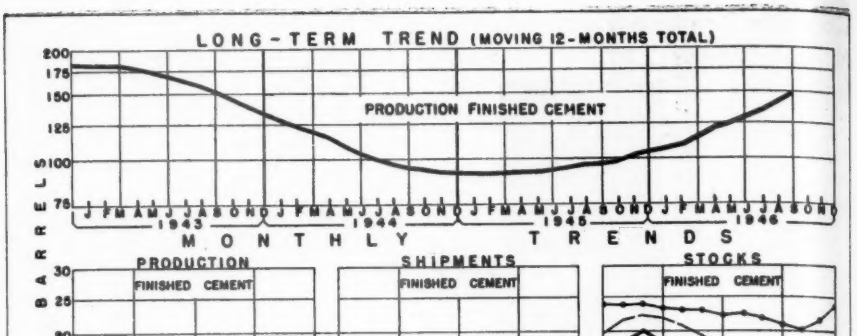
Domestic Freightcar Needs To Have Priority over Foreign Orders—CPA

Because of the urgency of domestic railroad needs, steel for the production of domestic freight cars has been given the green light over requirements for export freight car output, the Civilian Production Administration has reported.

Freight cars awaiting repairs totalled approximately 67,294 units on November 1, or approximately 4 percent of all cars available for service, CPA said. This percentage represents a net reduction of 15,514 "bad order" cars (cars needing repairs) or approximately 18 percent of the backlog existing in July, 1946. On that date CPA, working with the steel industry, started expediting deliveries of steel to the car repair shops.

While this reduction in bad order cars was an encouraging development, CPA said, production of new freight cars has not progressed as rapidly as had previously been anticipated. This lag occurred primarily because the car builders had scheduled export orders last year when domestic demand had not yet appeared in full force. The car manufacturers said that a rescheduling of operations in the midst of production would have resulted in inefficient operation of their plants and severe financial losses, and would not have benefitted the domestic program proportionately.

CPA, however, now reports that the situation requires that domestic production have precedence over all export needs, despite the fact that most of the foreign orders are from war-devastated countries of Western Europe, whose freight car needs are acute.



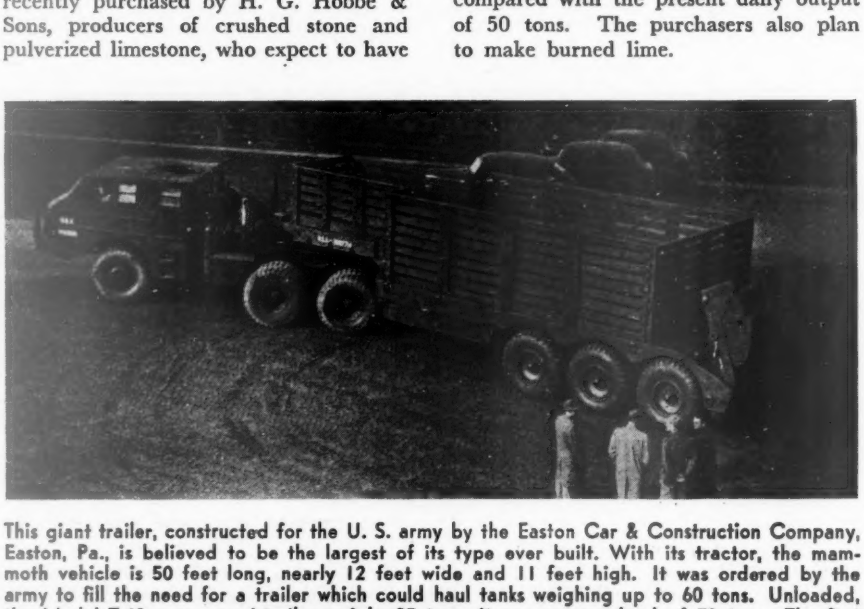
Production of 16,450,000 barrels of finished portland cement during September, 1946, reported to the U. S. Bureau of Mines, was 67 percent greater than that reported for September, 1945. Eighty-three percent of capacity was utilized, but production did not meet demands and mill stocks continued to decline to a September 30 total of 8,605,000 barrels. This is a decrease of 41 percent from that reported in September, 1945. Mill shipments reached 17,153,000 barrels in September, 1946, an increase of 53 percent over that reported in the corresponding month of 1945. Clinker production of 15,960,000 barrels in September, 1946, represents an increase of 61 percent over that reported for September, 1945. Demand for cement, as indicated by mill shipments, in September, 1946, was higher in all districts than the corresponding month of 1945. Increases range from 6 percent in Iowa to 118 percent in Kansas and 400 percent in Hawaii.

The long-term trend in production of finished cement, as well as production, shipments, and stocks, is shown graphically in the accompanying chart. Only shipments and stocks follow the 1935-39 trend, and the moving 12-months' total continues its upward trend.

Hoosier Lime Corp. Bought By Crushed Stone Producers

The Hoosier Lime Corporation of Salem, Ind., inactive since 1932, was recently purchased by H. G. Hobbe & Sons, producers of crushed stone and pulverized limestone, who expect to have the plant back in production by March.

Hoosier facilities will be used as an annex to the Hobbe plant. Together the two plants are expected to reach a producing capacity of 200 tons a day, as compared with the present daily output of 50 tons. The purchasers also plan to make burned lime.



This giant trailer, constructed for the U. S. army by the Easton Car & Construction Company, Easton, Pa., is believed to be the largest of its type ever built. With its tractor, the mammoth vehicle is 50 feet long, nearly 12 feet wide and 11 feet high. It was ordered by the army to fill the need for a trailer which could haul tanks weighing up to 60 tons. Unloaded, the Model T-63 cargo semi-trailer weighs 25 tons; it can carry a load of 70 tons. The first of two such units ordered from Easton by the Ordnance Department was recently tested at the Aberdeen Proving Grounds in Maryland.

28th A.E.D. Convention Scheduled for Feb. 13-15

The twenty-eighth annual convention of the Associated Equipment Distributors will be held February 13, 14 and 15 at the Edgewater Beach Hotel, Chicago, Ill. It is expected that 1,400 executives of member companies from the construction equipment industry will attend.

High on the list of subjects to be discussed at the convention, which will be presided over by F. B. McBath, A.E.D. president, will be the disposal of surplus government-owned construction and road-building machinery.

Expanding Georgia Firm Reopens Barytes Operation

Thompson, Weinman & Co., Cartersville, Ga., has acquired marble properties west of Sylacauga, Ala., which will be operated by J. G. Miller, with expected production at the rate of 4,000 tons a month. Output will be used to supply requirements of the firm's Carterville plant.

The company also plans to reopen the flotation plant of its Paga barytes mine at Cartersville, where improvements have been under way.

Cowham Eng. Company Now Cement Engineering Company—Retains Staff

According to an announcement made by S. W. Storey, the Cowham Engineering Company recently discontinued its engineering services and is currently in process of liquidation.

A new organization, Cement Engineering Company, located at the same business address, 111 West Monroe Street, Chicago 3, will perform the same functions as the former Cowham Engineering Company. Mr. Story, who is president of the firm, stated that the employee personnel would remain unchanged.

Cowham has long performed engineering and advisory services for the Florida Portland Cement Company, Signal Mountain Portland Cement Company, Consolidated Cement Corporation and Trinity Portland Cement Company.

FHA's Foley Named to Head National Housing Agency

Raymond M. Foley, recently appointed by President Truman as administrator of the National Housing Agency in addition to his duties as commissioner of the Federal Housing Administration, issued a statement shortly after his appointment. He stated that his belief in a coordinating type of over-all agency for long-range housing activities has long been known, and that this type of agency was to be preferred over one with directive powers over constituent units which have responsibilities under separate statutes.

New Cement Specifications Issued by Technical Committee

The Technical Committee on Cement, Lime and Plaster of the Federal Specifications Executive Committee, National Bureau of Standards, has developed new federal specifications SS-C-192 on portland cements. Three types of cement specified are as follows: a high sulphate resistance type which retards flaking and cracking of concrete in soils having a high concentration of sulphate; a type having a low heat of hydration, which prevents excessive generation of heat in thick sections, a condition tending to weaken the structure; the air-entraining type, with Vinsol Resin additive.

Copies of SS-C-192 are available at the Government Printing Office, Washington 25, D. C., for five cents each.

75th Anniversary Observed By Missouri Mines School

An academic convocation commemorating the 75th anniversary of the founding of the Missouri School of Mines and Metallurgy was held recently in Rolla, Mo. Dr. Frederick A. Middlebush, president of the University of Missouri, presided at the meeting, and Dr. Eugene McAuliffe, chairman of the board of trustees of the Union Pacific Coal Company, delivered the principal address.

Since the opening of the school on November 23, 1871, it has expanded from a one-building institution with two faculty members and 28 students to a modern technological plant valued at more than $3,000,000, in which over 100 faculty members instruct approximately 2,200 students. During its 75 years the Missouri School of Mines and Metallurgy has provided technical and scientific education for more than 10,000 students from every state in the Union and also from many foreign countries.

Our editorial staff, devoting all its time to Pit and Quarry Publications, is larger, more experienced and more capable than ever before, and are supplying more interesting and helpful technical, operating and general information to our readers than ever before.

We urge our readers to look over the advertising pages carefully also because there is much valuable information of interest in them, prepared as the result of long and careful study by the technical and advertising experts of nearly every important manufacturer selling to this field.

Red Cross Asks Americans To Support 1947 Campaign

The American National Red Cross, in launching its 1947 fund campaign, is stressing the various types of activities currently carried on around the world. The American people are urged to support the campaign to the limit of their giving ability, in order to aid in important efforts such as the following: distribution of food and clothing to destitute children and invalids in Europe; aid to Americans in disaster-ridden areas; training of mothers in home-making; packing of Junior Red Cross gift boxes; welfare work among American forces overseas; recreational, medical and psychiatric work with disabled World War II veterans.

Modernization of Loring Plant To Be Completed This Spring

Plans are under way for the complete overhauling of the Loring Quarries facilities at Bonner Springs, Kan. The company's original plan was to build a concrete block plant at Bonner Springs. However, overcrowding and current high demand for agricultural limestone and riprap caused a changeover to the present project, which involves replacement of worn-out equipment and the modernization of the entire plant. The remodeling is expected to be completed by March 1.

Among the pieces of new machinery will be a crusher which will triple the present output and two auxiliary crushers, as well as additional trucks.

Carney Co. Organizes New Firm for Manufacture Of Rock Wool in Wash.

Murray Estes of Moscow, Ida., was named chairman of the board and Harry E. Carney Jr., Mankato, Minn., president of the new Carney Pacific Rockwool Company, Inc., at its organization meeting held recently in Seattle.

The new company is an affiliate of the 63-year-old Carney Company, Inc., of Mankato, of which Mr. Carney is also president. It will begin construction immediately of a plant at Longview, Wash., several miles south of that city on the Columbia River. The plant will manufacture Carney Golden Fleece Batts for new construction and Silver Fleece Granular Rockwool for modernizing.

Other officers of the Pacific coast company named at the meeting include the following: W. B. Lee, Mankato, executive vice-president; Carl Heim, Chicago, vice-president in charge of Western operations; C. K. Bowe, Mankato, treasurer; Mary Gaffey, Mankato, secretary.

The Longview plant will be built of concrete blocks, with provision made for future expansion. The capacity of the new plant will be around 20,000 tons of insulation annually.

Federal Portland Cement Making Batts in New Plant

The Federal Portland Cement Co., Inc., of Buffalo is manufacturing batts from rock wool in a new continuous, automatic process at the rate of four or five carloads a day in a new $250,000 plant.

There are two production lines at the plant. One produces a fluffy, cotton-like rock wool; the other, the rock-wool blankets with their moisture-proof paper backs. The blankets are cut automatically into batts as they emerge at the end of the line, where they are compressed and packed into cartons.

Lawrence Portland Cement Company Moves Its Office

The Lawrence Portland Cement Company has transferred its sales office from the mill in Thomaston, Me., to Augusta, Me., where it will be under the supervision of Walter E. Bow, sales manager.

Three and a half years ago the company officials tried out an experiment of having its sales office at the mill. Now it has been decided that in order to furnish better service and more convenient facilities for customers, a suite of offices will be opened at 256 Water street in Augusta.

The Pit and Quarry Directory lists all the important nonmetallic minerals produced, both alphabetically and geographically. It is distributed free only to those listed in it. To all others the price is $15.00 per copy.

Gulf Coast to Have Plenty Of Plaster—Houston Firm Opens 200-Ton-a-Day Plant

The first shipments of finished wall plaster from the Gulf States Gypsum Company of Houston marked the beginning of a new industry for the Texas Gulf coast. The product, Dixie Plaster, is manufactured at the firm's plant near Hockley Station, 35 miles northwest of Houston. Construction of Gulf States facilities are nearly completed, according to Kent Diehl, general manager, who is also the founder and former president of the Gulf Portland Cement Company of Houston.

The anticipated capacity of the plant will be 200 tons per day; but officials estimate that this figure will have to be stepped up as the demand increases. At present the company will concentrate upon the manufacture of wall plaster; but eventually it will make other types and will also offer raw gypsum to cement manufacturers.

The Hockley plant is located over what is claimed to be the only developed source of gypsum near tidewater in the United States. The deposit was discovered in 1919 by the Freeport Sulphur Company, and initial steps were taken to work it in 1928.

Officers include George A. Butler, president, Frank Knapp, secretary, and E. J. Rhodes, vice-president and treasurer.

3rd Quarter Gypsum Output Reported at 1,522,455 Tons

The gypsum industry continued its high production rate during the third quarter of 1946, in an attempt to close the gap between requirements and supply. Domestic mine output of crude gypsum reached 1,522,455 short tons, a post-war record and 59 percent over the comparable period of 1945. Production of calcined gypsum was 86 percent over the corresponding period of 1945.

Gypsum board and lath production attained a new post-war high in the third quarter, aided by premium payments by the National Housing Agency to the manufacturers of gypsum liner paper.

Contractors holding HH ratings for gypsum board have complained for several months that they have been unable to obtain board from distributors. The Civilian Production Administration on September 1, 1946, ordered distributors to set aside 85 percent of their board receipts for the Veterans Housing program, and it is now reported that the supply for this use is much easier.

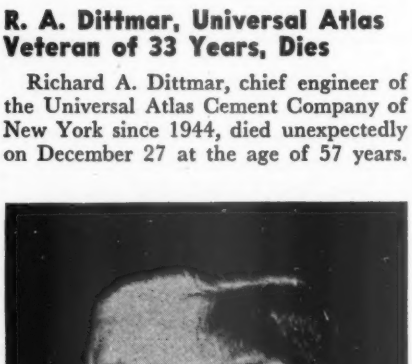
Gulf Portland Employees Honored for Safety Record

In recognition of the winning of the 1945 safety trophy awarded by the Gulf Portland Cement Association, the 85 employees of Houston's Gulf Portland Cement Company and their families were feted by the firm at a picnic. During 22 months 400,000 man-hours were recorded without a single lost-time accident.

Present at the picnic were representatives of the firm's parent company, the Ideal Cement Company of Denver, Colo.

R. A. Dittmar, Universal Atlas Veteran of 33 Years, Dies

Richard A. Dittmar, chief engineer of the Universal Atlas Cement Company of New York since 1944, died unexpectedly on December 27 at the age of 57 years.



R. A. Dittmar

He had been affiliated with the firm since 1913.

Mr. Dittmar served at the Hannibal, Mo., plant of Universal Atlas as power superintendent, power and maintenance superintendent and assistant plant manager. In 1924 he was made manager of the Hudson, N. Y., plant, where he distinguished himself by his important engineering accomplishments. At Hudson he was also active in promoting the firm's safety program and in serving on the War Production Board's county salvage division. Mr. Dittmar was formerly chairman of the Cement and Quarry Section of the National Safety Council.

When he was appointed chief engineer, he went to New York and assumed charge of the company's modernizing program, including the completion of the engineering work for the new plant at Northampton, Pa., and the rehabilitation of the plant which the firm had acquired at Osborn, O.

Crushing Plant Restrained From All-Night Operation

At Jonesboro, Ark., Chancellor Francis Cherry ordered the Eastern Arkansas Construction Company to restrict its operation of a rock crushing plant to the hours of 7 a.m. to 7 p.m.

The ruling was made after residents of the community had complained that 24-hour operation of the plant had prevented them from sleeping. The firm claimed that the day-and-night schedule was necessary to fill a contract for 100,000 yards of crushed gravel.

Ancor's Wartime Plant At Harleyville Placed on Temporary Stand-By Basis

The Ancor Corporation's plant at Harleyville, S. C., which was built for the recovery of alumina from clay by the lime-soda-sinter process, has been on stand-by since August pending a decision on the ultimate disposition of the property. The plant was constructed during World War II with funds furnished by the Reconstruction Finance Corporation. It was operated, and is at present still maintained, by the American Nepheline Corporation.

It is understood that the recovery process had been virtually perfected at the time the stand-by order was issued. The property has not been declared surplus. A final decision regarding future operations is expected early in 1947.

Chicago Engineering Firm Forms Nonmetallics Division

The firm of Paul E. McKamy & Associates, engineers, 8 South Dearborn Street, Chicago, announce the addition of a Rock Products Engineering Division.

The new department will serve the industry by consulting services, designing special equipment, preparing complete plant layouts and planning for crushed rock, limestone, sand and gravel and diatomaceous earth operations. Members of the firm are also specialists in the design and construction of rotary driers, rotary calcining kilns, coolers, furnaces, conveying equipment and so on.

Cement Industry in Japan Hampered by Shortages

Eleven Japanese cement companies operating 36 plants have a present total capacity of 270,000 metric tons per month, according to the *Report on Non-Military Activities in Japan, SCAP, April and May, 1946.* It has been estimated that after the damage to facilities caused by Allied air raids has been repaired, the 1947 capacity may reach 370,000 tons, and that by 1949 a possible 500,000 tons. Production for the years from 1930 to 1946 (metric tons) was as follows:

1930—	3,290,387	1938—	5,705,561
1931—	3,213,279	1939—	5,945,671
1932—	3,312,430	1940—	6,002,379
1933—	4,274,307	1941—	7,828,459
1934—	4,400,827	1942—	4,356,023
1935—	5,392,002	1943—	3,767,666
1936—	5,570,924	1944—	2,959,686
1937—	5,833,911	1945—	1,176,159

1946 Production

January—	34,137	March—	68,933
February—	38,402	April—	82,724

(Source: Cement Association)

The most critical shortages are in coal, raw materials, spare parts, transportation and labor. Steel plates for kilns, dryer shells, mill linings, grinding balls, conveyor-belts and ball bearings are among the parts especially needed. Although all used cement bags are returned, only two-thirds are fit for re-use.

In April only 71 percent of the coal allotted actually was received by the cement industry, and plant stock piles were greatly depleted. May production was estimated at 70,000 based on coal allotments.

Programs of N.C.S.A., Agstone Division Conventions Announced

The annual conventions of two important national organizations will be held during this month in Chicago. J. R. Boyd, administrative director of the National Crushed Stone Association, and Henry A. Huschke, managing director of that group's Agricultural Limestone Division, have supplied us with the following information concerning the two convention programs:

Thirtieth Annual Convention,
National Crushed Stone Association—
January 27-29, Edgewater Beach Hotel.

Monday, January 27

Morning session—Address by J. W. Follin, assistant administrator, Federal Works Agency, Washington, D. C.; subject, "The Construction Outlook."

Greeting luncheon speaker, Walter Chamblin Jr., vice-president, National Association of Manufacturers, Washington, D. C.; subject, "The Washington Scene."

Afternoon session—Address by Bernard E. Gray, general manager, Asphalt Institute, New York, and George H. Dent, institute district engineer, Washington, D. C.; subject, "Some Basic Principles Concerning Asphaltic Concrete." Second address, Whiting Williams, consultant and adviser on industrial relations, Cleveland, O.; subject, "Getting Worker Co-operation Today."

Tuesday, January 28

Morning session—Talk by Arthur Boase, chief, Structural Bureau, Portland Cement Association; subject, "Concrete for Housing and Building Construction." Second talk by A. T. Goldbeck, engineer director, N.C.S.A.; subject, "Studies of Gravel versus Stone in Traffic Bound roads."

Luncheon—Annual business meeting of the Manufacturers' Division.

Afternoon session—Address by Theodore F. Hatch, Industrial Hygiene Foundation of America, Pittsburgh; subject, "Dust Control in Industry." Second speaker, J. Spencer Smith, president, American Shore and Beach Preservation Association, New York; subject, "Expanding Opportunities for Use of Stone in Shore Line Protection."

Wednesday, January 29

Morning session—Roundtable discussion among operating men and equipment manufacturers.

Luncheon — Speakers: George Romney, Automobile Manufacturers Association, Detroit; subject, "Management-Union Co-operation—Some of the Major Obstacles"; Dr. L. Don Leet, subject, "Vibration Tests of Delayed Action Blasting"; L. F. Miller, New York Trap Rock Corporation, subject, "Delayed Action Shooting."

Banquet—Presentation of safety awards by A. J. R. Curtis, assistant to general manager, Portland Cement Association, Chicago. Address by Col. Jack Major, Paducah, Ky.

Second Annual Convention
Agricultural Limestone Division
January 30-31, Edgewater Beach Hotel

Thursday, January 30

Greeting luncheon speaker, Wayne Darrow, of "Washington News Letter"; subject, "Back of the Farm Scenes in Washington."

Afternoon session—Address by Grant Thompson, assistant director, Field Service Branch of the Production and Marketing Administration, U. S. Department of Agriculture; subject, "The 1947 Agricultural Conservation Program." Second address, Dr. Hugh H. Bennett, chief of Soil Conservation Service, U. S. Department of Agriculture; subject, "Proper Use and Care of the Land."

Friday, January 31

Morning session—Address, Dr. Kenneth C. Beeson, U. S. Plant, Soil and Nutrition Laboratory; subject, "Effect of Supply and Availability of Plant Food Nutrients on the Quality of Food and Feed Crops." Second address, B. J. Firkins, Iowa State College of Agriculture; topic, "Factors Governing the Efficient Use of Limestone." Third address, Grover Brown, chief of the agronomy section, Soil Conservation Service; subject, "Proper Use and Care of the Land."

Afternoon session—Address, Dr. George Scarseth, director of research, American Farm Research Association; subject, "Food or Atomic Bombs—It's Up to Us." Annual business meeting and election of officers.

P.C.A. Announces Promotions Of Three Research Veterans

Promotion of three veteran members of the Portland Cement Association's scientific research staff has been announced by Dr. A. Allan Bates, vice-president for research and development.

F. R. McMillan, the association's director of research since 1927, has been promoted to assistant to the vice-president for research and development.

H. F. Gonnerman, manager of the association's research laboratory in Chicago for the past 19 years, has become director of research.

William Lerch, senior research chemist in the Chicago Laboratory since 1940, has been promoted to manager of the department of applied research.

F. R. McMillan joined the association staff in 1924 as associate engineer. From August, 1925 until March, 1927, he was manager of the association's structural bureau. He became director of research in 1927. Mr. McMillan is a civil engineering graduate of the University of Minnesota, where he was later an assistant professor of engineering. During World War I he was drafted by the U. S. Shipping Board as a research engineer.

H. F. Gonnerman became a member of the association's research staff in 1922 as associate engineer and became manager of the research laboratory in 1927. Mr. Gonnerman holds B.S. and M.S. degrees from the University of Illinois. He is the author and co-author of many reports on concrete.

William Lerch holds a B.S. degree in chemistry from Beloit College and a Master's degree in chemistry from the University of Wisconsin. He has been a member of the association staff since 1923. From 1924 to January, 1940, he was a member of the association's fellowship staff at the National Bureau of Standards in Washington, D. C.

William Lerch

H. F. Gonnerman

F. R. McMillan

British Quarrying Institute Discusses Future Plans At First Post-War Meeting

In England the Institute of Quarrying has recently held its first meeting since 1939. The proceedings were reported in the November, 1946, issue of *The Quarry Managers' Journal,* official organ of the institute.

This meeting was held at Buxton, England, October 14-17, 1946. The conference was opened with an address by W. F. Wilson, now immediate past president. In his talk Mr. Wilson paid tribute to the members of the institute who lost their lives in the war, and spoke on the future of the industry. He looked forward to a promising future for roadstone quarries, but felt that the prospects for operations of quarries more interested in building materials were not too bright so long as the Ministry of Health continues to control the price of the building of houses to a maximum which bars the use of stone.

The limestone quarries of the country are generally included with those in the roadstone class. In spite of wartime difficulties with the Ministry of Agriculture over the production of burned lime and ground limestone for agricultural use, Mr. Wilson predicted that operators will forget the treatment dealt out to them, now that lime for building purposes is so urgently required.

Continuing the pre-war custom, the general secretary, S. McPherson, gave his report, discussing the work done during the war years, the growth of organization membership, the work of the district branches, and the finances of the institute.

During the meeting new by-laws concerning membership were adopted. Various subjects for discussion were brought up and placed before the members. Frank Firth, district secretary of the Devon and Cornwall branch, introduced the subject "How Can the Manufacturer of Plant and Machinery Help the Quarry Owner?"

In the discussion following Mr. Firth's brief talk introducing the topic, J. R. Middleton-Walker, deputy president of the institute, who had recently visited the United States, pointed out that the American practice of installing a 400-t.p.h. plant to do a 250-t.p.h. job was more economical than the English practice, where a plant is installed to produce the bare output, and consequently must work continuously at peak load. He also praised the American practice of supplying voluminous and complete catalogs.

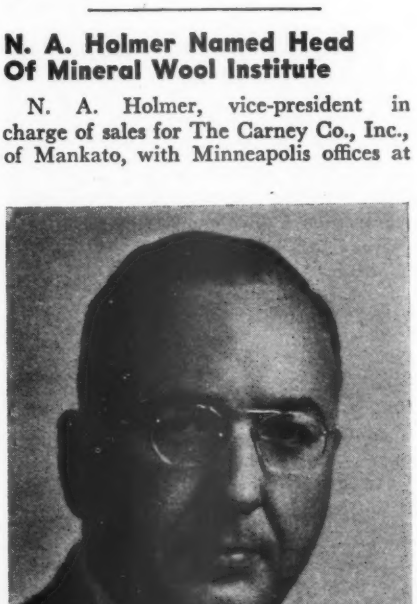
A. E. Ryeland entered the discussion and reminded the members of the very severe steel shortage, which he felt might bring light metals and alloys into the quarry machinery field. Furthermore, he said, the Ministry of War Transport imposes stringent conditions on machinery being used on English highways, and this again may bring about a greater use of light materials.

A proposal to standardize storage bins on a basis of 23 cubic feet to the ton, and to assume the natural angle of repose for material to be 35 degrees from the horizontal, was introduced by E. Bellringer, and after some debate was received favorably.

A celebration dinner was held, at which the new president was invested, and a gold watch was presented to the general secretary. Two hundred seventy-five members and guests attended.

N. A. Holmer Named Head Of Mineral Wool Institute

N. A. Holmer, vice-president in charge of sales for The Carney Co., Inc., of Mankato, with Minneapolis offices at



N. A. Holmer

125 South Fifth Street, was elected president of the Industrial Mineral Wool Institute of New York, at the organization's annual meeting, held in Cleveland.

The institute is an association of American and Canadian manufacturers of industrial insulation of all types.

Others named to office included the following: vice-president, L. H. Harriman, National Gypsum Co., Buffalo; treasurer, M. G. Jensen, Owens-Corning Fibre Glass Corp., New York; board members, T. C. Carter, Eagle Pitcher Sales Co., Cincinnati, and W. H. Hill, Baldwin Hill Co., Trenton, N. J.

The institute will hold its next quarterly meeting in March.

Damage estimated at $250,000 resulted from a fire at the plant of the Pennington Quarry Company of Pennington, N. J., recently. A machine shop and the diesel engine room of the plant were swept by the flames, which threatened to spread to a dynamite storage building and fuel oil supplies. It is estimated that repairs will be in progress for about two months.

OPA Ruling on Price Changes for Decontrolled Items Now Cancelled

It is no longer necessary to report price changes for commodities and services that have been decontrolled, the Office of Price Administration has reminded all lines of trade. An important rule that still remains in effect, however, is that all producers, processors, distributors and other sellers of any commodity under price controls are required to keep on hand for a year after date of decontrol of the commodity, all records, reports and other documents which they were required to maintain to the time of decontrol.

The former requirement for reporting price changes was revoked on November 19, 1946.

Marquette Loses J. J. Kelly, Industrial Relations Chief

John J. Kelly, for 20 years manager of industrial relations for Marquette Cement Manufacturing Company, died suddenly of a cerebral hemorrhage December 7 at St. Mary's Hospital in La Salle, Ill. Mr. Kelly was 53 years of age and in generally good health until he was stricken December 5 while on a business trip to the Oglesby plant.

Born and raised in La Salle, Mr. Kelly had attended parochial schools there and St. Bede's College in Peru, Ill. He became associated with Marquette Cement Manufacturing Company at its Oglesby plant in 1927, where he subsequently served as office manager then employment manager. In 1937 he was appointed Marquette's manager of industrial relations and in that capacity two years ago moved his headquarters to Chicago.

Marquette's long, uninterrupted record of intra-company harmony stands today as a monument to Mr. Kelly's sagacity. There have been no strikes in the Marquette organization for over 30 years. In that regard, the feelings of those with whom he transacted business were generally summarized by William Schoenberg, president of the United Cement Lime & Gypsum Workers International Union, who, upon learning of Mr. Kelly's passing, stated: "John Kelly was eminently fair. He stood high among those at Marquette who have contributed to that mutual understanding and sound, friendly relationship between labor and management which is so vital."

Blue Mountain Clay Co. Produces New Absorbent

A new granular absorbent material produced from an aluminum silicate material announced by the Blue Mountain Clay Company, Inc., of Memphis, Tennessee, is said to be capable of absorbing 120 to 140 per cent. of its own weight. It is designed for use on oily, greasy or wet floors to eliminate the danger of accidents due to slipping, as well as to guard against the possibility of flash fires. The granules weigh up to 30 pounds per cubic foot.

Idea Development Corp. Buys Slate Quarries In New York, Vermont

Eighteen slate quarries near Granville, N. Y., and Pawlet, Poultney and Wells, Vt., has been purchased by the Idea Development Corporation of Buffalo, N. Y., to provide material for the manufacture of a new line of slate brick and tile developed experimentally at Buffalo. Bricks will be sawed from solid slate for building fronts and the tile will be made from quarry refuse.

Roofing and mill stock will also be produced. The company plans to use air transportation for its personnel and for small shipments connected with its research work.

Workers are now pumping out two quarries in the Granville area, and officials expect to have four quarries in operation by spring. Roofing and flagging is currently being made near Granville.

According to William G. Frank, secretary-treasurer of the firm, about 7,000,000 tons of scrap slate is lying above ground in the Granville district. Slate of 13 colors is found in the quarries, making possible the production of tile in various color combinations. Theodore Q. Cromp, vice-president, states that seven products will be turned out from slate refuse.

The 18 New York and Vermont quarries and two marble quarries and one slate quarry in Georgia were acquired by the Idea Development Corporation from the H. G. Williams Slate Company.

Phosphate Rock Production High in First Half of 1946

Total mine production of phosphate rock in the United States during the first half of 1946, according to reports of producers to the U. S. Bureau of Mines, was 3,283,179 long tons. Phosphate rock sold or used in this period—3,271,100 long tones—was over 600,000 tons more than in the corresponding period of 1945; the value, $13,878,651, was over $3,000,000 greater. The average value of the phosphate rock sold or used increased slightly, from $4.02 per ton in the first half of 1945 to $4.24 per ton in the same period of 1946. Total stocks in producers' hands on June 30, 1946, were markedly less than at the end of June, 1945.

During the first half of 1946 phosphate rock was mined in Florida, Tennessee, Idaho and Montana, and apatite in Virginia. Florida was the leading shipper, as usual, its marketed production increasing to more than three times that of its nearest competitor, Tennessee.

Ash Grove's Drill Rig Shown At N.L.A. Division Meeting

One of the most interesting of the many valuable operating kinks described at the recent meeting of the Operating Division of the National Lime Assn. at Hershey, Pa., was a Jumbo drill rig developed by the Ash Grove Portland Cement Co., Kansas City, Mo., for its limestone mine.

This unit is a movable framework of tubular steel construction mounted on a crawler tractor. Two drifter drills are mounted on a crossbar on this frame which is raised and lowered by a winch on the tractor. Each drill can be turned in any desired direction and the entire setup has worked out very well for driving tunnels and for general drilling. Not only does it speed up drilling, but it has also resulted in improved blasting efficiency. Two men with one drill now drill 250 feet of hole daily and two drills turn out 450 feet.

• Right: The Ash Grove Portland Cement Company's drill rig in operation at its limestone mine.

High-Test Limestone Beds Worked by New Concern

The Wallace Limestone Company, owned by a group of Ridge Farm, Ill., men, began producing agricultural limestone at a new plant near Wallace, Ill., late last year. Their equipment, which includes an electric crusher, and loading facilities, will produce 600 tons of material in an 8-hour shift. The limestone deposits on the company's premises is said to test 80 to 96 percent calcium.

Joe M. Pugh is plant manager. The other members of the firm are Harlan and John Hester and Frank Carsman.

Marquette's Billboard Effective Good Will Promoter at Oglesby

Billboard space designed solely to carry out a localized public relations theme is currently being used by Marquette Cement Manufacturing Company at Oglesby, Ill.

On a corner lot near the center of the town, a site passed daily by all Marquette employees and many residents, the company had erected a standard billboard featuring the following copy:

"Some 550 men and women from this surrounding community make their living here by producing the best in cements.

"Many of these and other men and women have made this plant possible by investing their savings here in hope of a return for its use.

"This is America's unexcelled system of private enterprise at work." The background for this message is a montage effect comprised of bridges, dams, highways and housing, which suggests the vital part the product manufactured there plays in modern civilization. Separate but integrated into one side of the board is a readily changed circular panel devoted to a "flash" message tying in with current civic projects, such as safety campaigns and Community Chest drives. Formerly a vacant lot owned by Marquette, the site is being landscaped and will be maintained by the company.

• Marquette Cement Manufacturing Company's latest good will gesture set up near the plant at Oglesby, Ill.

Federal Labor Policy for America Urged by Randall At Industrial Congress

Clarence B. Randall, president of the Inland Lime and Stone Company of Manistique, Mich., and vice-president of the National Association of Manufacturers, recently addressed the 51st congress of American industry in New York City.

Clarence B. Randall

Mr. Randall's subject was "A New Federal Labor Policy." He advanced the suggestion that a federal labor policy should be formulated by the American Congress, rather than by the department of labor or the President. An ideal policy of this kind, he stated, should stress freedom for the worker and the public and responsibility under law on the part of management.

California Lime Concern Taken Over by New Organization

The Resource Engineering Company of San Francisco has taken over the management of the facilities of the Auburn Lime Products Company, Auburn, Calif. Extensive improvements will be made both at the quarry and in the plant. Ray A. Graetz is plant superintendent.

Officers of the Resource Engineering Company, a newly-organized concern, are as follows: president, L. K. Lacey, formerly general auditor of the American Smelting and Refining Company; vice-president, J. D. Herman; secretary-treasurer, C. S. Smith; consulting engineer, George W. Nielsen, formerly superintendent and engineer at Basic Refractories, Inc., of Cleveland.

Testing Service to Make Ninth U.S. Inspection Tour

The Cement Reference Laboratory, a joint project of the National Bureau of Standards and the American Society for Testing Materials, is preparing for its ninth inspection tour among cement testing laboratories. Requests for that inspection service should be filed at once with the Cement Reference Laboratory, National Bureau of Standards, Washington 25, D. C.

The inspection service is still closely limited to the methods and equipment used in the standard physical tests of hydraulic cements. The work includes the verification of compression testing machines employed in testing cement; but lever-weighing machines having a capacity greater than 100,000 pounds are not ordinarily included. Each laboratory is expected to have at least one of its staff members available to demonstrate the standard cement tests at the time of the inspection.

Barbour, Gray to Head Asphalt Institute Staff

At the annual meeting of the Asphalt Institute's board of directors, held on December 4 at New York, C. Wayne Barbour of the Allied Materials Corporation, Oklahoma City, was elected president and executive committee chairman. Also elected to the committee were George R. Christie of the Socony-Vacuum Oil Company, Ingraham Grayson of the Lion Oil Company, Raymond Harsch of the Shell Oil Company, Inc., James J. Kelly of the Kerr-McGee Oil Industries, Inc. (Fen-Ter Refining Division), D. N. Myers of the Byerlyte Corporation and J. S. Sawyer of the Shell Oil Company, Inc.

Bernard E. Gray was re-elected general manager-chief engineer, and Herbert Spencer was named secretary of the institute. Other officers chosen included F. V. Widger of the Witco Chemical Company, treasurer, and John N. Smith of the Socony-Vacuum Oil Company, Inc., assistant treasurer.

Mr. Barbour, newly-elected president of the institute, is one of the founders of Allied Materials, of which he is now president.

B. E. Gray

October Figures Show Home Construction Lags In States East of Rockies

Declines in residential building were indicated in October on the basis of construction contracts awarded in the 37 states east of the Rocky Mountains, it was reported today by the F. W. Dodge Corporation. On the basis of reports from its field staff, the Dodge Corporation revealed that October contracts for home building totaled $235,068,000, as against $293,831,000 in September.

Increases in nonresidential awards were reported in October, the gains being especially pronounced in buildings used for manufacturing purposes. Total nonresidential building awards were $225,355,000, as against $169,627,000 in the preceding month. Total of all building contract awards in October was $573,206,000, as against $619,857,000 in September.

Pronounced gains earlier in the year brought the total for the first ten months to $6,528,699,000, as compared with $2,598,531,000 in the corresponding ten months of 1945.

Georgia Concern Operates Plants in Three States

The New Riverside Ochre Company, Cartersville, Ga., recently began operating a beneficiation plant in the barytes area near Tiff, Mo., where about 800 tons of the material is produced each month. In charge of the new operation is Reese Woolford, former assistant superintendent of the firm's Cartersville plant.

A new revolving grizzly has been installed at the Cartersville barytes-washing plant, where production is running at 1,700 tons per month. At the company's properties in the Sweetwater area in Tennessee production of crude barytes is approximately 40 tons per day. Tom Duckett, formerly superintendent at Cartersville, is in charge there. He was succeeded at Cartersville by John Cobb.

C. W. Barbour

Solution of Dust Problem In Industry Explained At Hygiene Group Meeting

The official registration for the eleventh annual meeting of the Industrial Hygiene Foundation was 423 persons. The meeting was held at the Mellon Institute in Pittsburgh, Pa., on November 7, 1946, despite a hotel strike in that city. Members and guests were quartered in suburban hotels, clubs, the "Y" and private homes. Round table conferences held the day before and the day after the meeting were well attended.

The keynote address of the meeting was delivered by Admiral Ben Moreell, formerly Federal Coal Mines Administrator, now president of the Turner Construction Company. Admiral Moreell's talk was entitled "Production Comes from People."

A report summarizing the significant developments and trends gleaned by the I.H.F. chemists and engineers from field work and studies in various industries in the past year was presented by F. R. Holden, Ph.D., W. C. L. Hemmon and Theodore F. Hatch, all of the Foundation. The value of industry-wide studies and quantitative studies; the design of ventilating systems and other control measures; and the appraisal of dust hazards and of dust control measures were discussed by the authors.

In the afternoon an address on "Management's Opportunity to Advance Occupational Health" was presented by R. H. Pass, president, Onondaga Pottery Co., Syracuse, N. Y. This talk is important to producers in the pit and quarry field, in that it shows what steps a related industry has taken to eliminate silicosis.

Mr. Pass explained that in the old days the potteries had the reputation of being unhealthy places in which to work. The old potters called the disease which they contracted in the potteries "potter's rot." Later, it was known as "consumption," and today we know that it is actually acute tuberculosis superimposed on silicosis.

Several operations in a pottery are especially dangerous from a silicosis standpoint. In the handling of the clay, in the forming of it, and in the drying of the clay and the subsequent finishing, it is very difficult to prevent small particles from breaking from the ware and falling to the floor to be ground into dust. As this dust has a silica content of 35 percent, and as a considerable portion of the dust is of less than five microns in size, it constitutes a real silicosis hazard.

In the first fire, the body of the ware being heated must be supported by packing or bedding it in flint, fire silica or sand, since the high temperature tends to cause the clay to lose its structural strength and slump. When the ware comes from the furnace, this silica, now calcined, must be brushed or scraped off. The danger of this dust, which is almost 100 percent SiO_2, is obvious. By using an especially prepared clay, instead of flint or silica, the danger of silicosis from bedding the ware can be, and has been, eliminated.

Careful housekeeping and keeping the shops immaculately clean has served to eliminate the dust from the air around the clay handling operations. Constant research and unremitting effort have pushed the dust count in the Onondaga plant below 100 particles per cc, a harmless concentration.

As a result of this work, old employees have been protected and are now alive, producing for their family and the company. New employees have been protected as well, and are now silicosis free, whereas they might well have been seriously infected. Equally important, it is now no longer difficult to get people to enter the pottery to work in once hazardous departments.

Warner Company Promotions Revealed for Curtin, Whitten

The board of directors of the Warner Company recently announced the creation of a new position, that of executive vice-president, to which they have elected John Curtin Jr. Mr. Curtin, who has long been associated with the firm, assumed his new title and duties on January 2. He began working at the company's Bellefonte plant many years ago and then was engaged in sales work. For the last four years he has been vice-president in charge of operations at Bellefonte.

Herbert J. Whitten was also the recipient of a promotion. He was elected a vice-president of the company, to be in charge of all eastern and central Pennsylvania lime and stone operations. The promotion became effective on January 2. Mr. Whitten was formerly general superintendent of Philadelphia operations and more recently general plants manager of the firm's Eastern operations.

Union Portland Cement Co. Plans Expansion In Its Fortieth Year

In the December issue of the *Ideal Cement Mixer,* published by the Ideal Cement Company's employees, there appeared a short article by O. B. Gilson, vice-president of the Union Portland Cement Company of Denver, in which he announced the 40th anniversary of that firm, an Ideal subsidiary. Mr. Gilson stated that although the company was incorporated in 1904, building was not started until 1906. At first the firm had to dispose of a large part of its 2,000-barrel-a-day output on the Pacific coast, as there was not sufficient local demand.

Things changed, however, over the last 40 years, and the high demand in the Denver area now keeps the Union mill rolling at top speed. With the proposed new expansion, including a 375-foot kiln, the firm expects to boost production to 4,000 barrels a day.

Boston Allis-Chalmers Plant Terminates Long Walkout

Workers at the Allis-Chalmers Manufacturing Company's plant in Boston ended their protracted strike when they returned to their jobs on December 9. Still out on strike, however, is the West Allis, Wis., plant, which employs more than 11,000 persons.

It was at West Allis that the walkouts began in March, 1946. Workers in the firm's plants at the following points then went out on strike: Boston, Pittsburgh, Norwood, O., La Porte, Ind., and La Crosse, Wis.

The Boston strike was called off after the company had signed an agreement with the C.I.O. Electrical Workers Union for a wage increase of 13½ cents an hour.

H. J. Whitten

John Curtin, Jr.

WASHINGTON NEWS LETTER

IN the six months since this page last appeared, the Washington scene has altered radically. The greatest change, of course, is political, and stems from the overwhelming Republican victory at the last election. With that party now in clear-cut control of both houses of Congress, the Democratic administration still running the executive branch of the government, and both parties laying the groundwork for the presidential campaign two years hence, there is a very real danger of stalemate which no amount of high-flown phrases can obscure. The working out of a *modus vivendi* between the White House and Capitol Hill will certainly not be easy. Even under the best of circumstances it will take plenty of time, and in view of the vital national and international issues which the government must face in the period ahead there is little room for complacency about the implications of a prolonged deadlock.

The most important questions on the legislative agenda for the present relate to the federal budget, foreign economic policy, and labor relations. Before the opening of Congress, Republican leaders had already virtually committed themselves to a 20 percent cut in income taxes. However, this commitment was not accompanied by any clear indication as to just where federal expenditures could be cut to offset the reduction in revenue. A number of rather wild statements have been made as to the huge economies which can be effected, but a careful examination of these proposals shows that, for the most part, they relate to non-recurrent expenditures like those for food subsidies, foreign loans, or terminal leave payments to veterans—savings which have already been taken into account in the President's budget recommendations. Another favorite proposal involves cutting the federal payrolls. But while this is always an effective oratorical device, it is becoming clear that the amount of money to be saved here is relatively small unless postal and other vital services are to be drastically reduced. The budget problem is not nearly as simple as has been made out, and Congress may well have to choose between two difficult alternatives—a modification or postponement of the tax cut, and a sharp curtailment of expenditures for national defense, by far the largest single drain on the treasury.

Many observers foresee a serious clash with the administration over questions of foreign economic policy, particularly in the touchy matter of tariffs. As part of a broad program for world co-operation in economic affairs, an International Trade Organization is to be set up this spring under the auspices of the United Nations. Its purpose is to eliminate many of the restrictive practices which obstructed the free flow of world commerce before the war, and as a first step, to work out a plan for world-wide lowering of tariff barriers. The State Department, supported by statutory authority to lower tariff rates up to 50 percent below January 1, 1945, levels, has taken a leading role in these negotiations for multilateral trade agreements. Foreign trade does not bulk particularly large in the U. S. economy, nor as a creditor nation do we have to worry about the goods we import. But for many other nations the situation is quite different. If we reduce our imports through higher tariffs, we shrink the principal market for their products and, in order to maintain some degree of financial stability, they have no alternative but to restrict their imports. The question of high versus low tariffs has important implications for domestic policy as well, but in the international sphere it is clear to State Department officials that unless the world is to revert to the unhealthy kind of extreme economic nationalism which characterized the 'thirties, tariff reductions negotiated on a true bargaining basis are essential. However, strong opposition on traditional lines is shaping up in Congress, and an effort will undoubtedly be made to repeal or restrict the tariff-lowering authority which is now on the books. The whole world will be watching to see how this issue is resolved, and on it to a large extent will be judged our sincerity in urging better "co-operation" among nations.

Probably the hottest debates in the new Congress will be generated by the proposals for some kind of restrictive labor legislation. But, regardless of the exact form of the compromise when it finally emerges, it is difficult to see how this approach will help to solve the underlying economic problem responsible for most current wage disputes. Six months ago the country was just completing a round of wage increases which had been won only after a series of severe and costly strikes. But today, partly as a result of the removal of virtually all price controls, consumer prices have advanced to an all-time high, above even the previous peak of the post-World War I inflation. The rise in food prices alone in the last six months has more than wiped out the earlier wage gains. Other prices have also shot up, and, according to the official figures, the real income of wage earners at the beginning of 1947 is roughly 10 percent lower than at this time last year. With the end of the inflation not yet in sight and the prospect of an increase in rents on the horizon, labor leaders will undoubtedly fight hard for higher wages. And their demands will be buttressed by the knowledge that business profits after taxes are today not only better than in the best peacetime years, but also well above the best wartime years.

For the year 1946 as a whole, for example, corporation profits after taxes were about 50 percent higher than in the big prosperity year of 1929, and about 25 percent more than at the peak of the war boom in 1943 and 1944. Furthermore, business improved throughout the year, and in the final quarter of 1946 profits after taxes were at an annual rate about 75 percent above 1929 and 50 percent above 1943-1944. Of course, these are aggregate figures and conceal fairly wide variations for individual companies. This was one of the main criticisms levelled at the widely publicized report on "A Wage Policy for 1947" prepared by Economist Robert Nathan for the C.I.O. But if some firms have not fared as well as the average, it is simple arithmetic that others must have done even better. Today, the nation is riding a boom of unprecedented proportions. Whether or not a downturn will come in 1947, as has been forecast in some circles, is open to debate, and economists are not at all agreed as to how serious the dip will be when it does come.

One of the main "ifs" is whether labor and management will be able to resolve their differences fairly and expeditiously, or whether these differences will develop into another gruelling test of economic strength.

Review for 1946 and Forecast of Highway and Other Construction

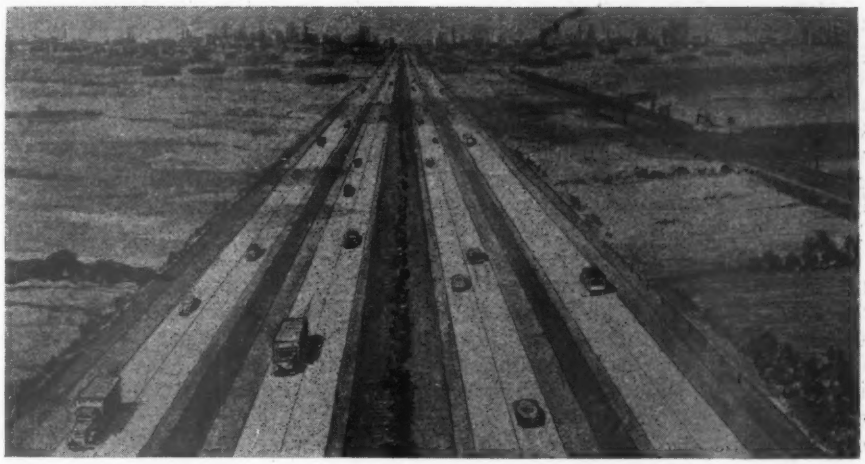
CONSTRUCTION in the United States can be expected to hit new high levels in 1947 in all categories: housing, nonresidential, highway, public works and utilities. According to the F. W. Dodge Corp., residential construction will gain 35 percent in number of units, and 38 percent in dollar volume over 1946. Nonresidential construction will gain 7 percent, which means more commercial, industrial and educational building. An anticipated gain of 22 percent in public works and utilities construction during the coming year would bring the total of all construction in the 37 states east of the Rocky Mountains to slightly more than $9,500,000,000, as against approximately $7,700,000,000, for 1946. (See PIT AND QUARRY, December, 1946, page 63.)

The Associated General Contractors of America predict that there will be a $20,000,000,000 volume of construction in the United States in 1947.

As of December 27, 1946, the Civilian Production Administration had approved 69,507 applications for non-housing construction since March 26, 1946. These applications represented a total estimated construction cost of $2,414,575,000. In the same period 49,150 applications, to cost $1,841,178,000, had been denied.

Dams and Reclamation

From Denver, the Bureau of Reclamation of the Department of the Interior reports that construction of reclamation projects in 1947 will require 3,500,000 barrels of cement. Of the total amount, approximately 1,250,000 barrels will be used in the Central Valley of California, where the major use will be for concrete lining of main canals now under construction. Work on the Coachella branch of the All-American Canal in the Coachella Valley of California will require about 150,000 barrels. Dams and canals to be constructed in the Columbia basin in Washington, and in the vast Missouri River Basin in the Great Plains region, will require approximately 550,000 and 750,000 barrels respectively. The total contract cost of all these operations will be close to $22,000,000.



• Figure 1—Drawing of Route No. 100 through Linden, New Jersey.

The Angostura Dam in South Dakota, and the Kortes Dam in Wyoming, will utilize approximately half of the total quantity of cement to be used in the Missouri Basin in 1947.

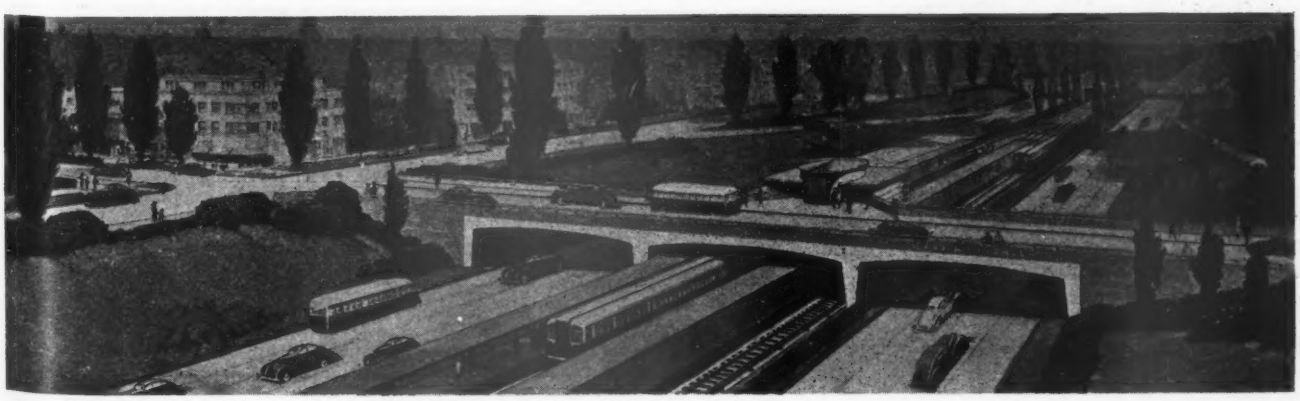
About 340,000 barrels are to be used in the construction at the Davis Dam in Arizona in 1947. Structures on the Colorado-Big Thompson Project will require about 190,000 barrels. The remaining amount of the 3,500,000 total will be required on other Bureau projects in the 17 Western states.

It is expected that approximately 4,000,000 cubic yards of separated aggregate from natural deposits will be used in Bureau concrete structures during the year. Only an estimated 250,000 cubic yards of this total will be crushed stone from quarrying operations, principally at Angostura Dam.

The Corps of Engineers has announced that bids will be opened on the Clark Hill Dam on the Savannah River above Augusta, Ga. This project, which is for flood control, navigation and power, will cost over $35,000,000. The contract for the Bull Shoals Dam on the White River in Arkansas will probably be awarded now that the ceiling on Engineer construction for the fiscal year has been raised. The Buggs Island reservoir on the Roanoke River, a $30,000,000 project (including cost of the dam), will probably also be let to contract soon. Construction will be continued on the Union Village Dam on the Onpompanoosuc River in Vermont.

State Highway Programs

In answer to a questionnaire sent out by PIT AND QUARRY, 41 states submitted data on their 1946 high-



• Figure 2—The projected Congress Street Superhighway in Chicago, at Halsted and Racine Streets.

way programs. Most of the others were not ready to announce their programs; a few failed to answer. The approximate dollar value of the construction completed and awarded in these states in the year 1946 is $714,874,000. This, in itself, is more than the value of construction completed in 1940 ($678,172,000), and when data is available for the remaining states, it is probable that the amount will top $750,000,000, which would be almost ten percent over 1940, a remarkable showing under the conditions existing in 1946.

Thirty-two states offered an estimate for their 1947 expenditure, and these estimates, when totaled, reach the spectacular figure of $935,970,000 for the year. Yet this is almost insignificant when it is realized that eight states alone have programs on paper that call for a collective expenditure of $4,532,000,000 within the next twelve years.

The state of New York, with a $500,000,000 reserve built up during the war, plans to let contracts in the amount of $200,000,000 in 1947, and by 1951 the state will have $840,000,000 in roads completed or under contract. Twenty years of deferred work will be rolled up into five years.

California must spend over $2,700,000,000 in the next twelve years to build a modern highway system. The state legislature was told that there was a choice between investing capital in a long-term productive highway plant and dissipating a greater amount in highway maintenance, high operating costs, increased insurance outlay and great loss of life.

Almost all of the states in the Union have much work to do on their highway systems. This condition is due not only to the war, when construction and maintenance were impossible, but also to many years of slashed appropriations from depression-pinched state legislatures.

Without the constant care they needed, the roads became inadequate and wore out. Reduced highway crews were unable to keep pace with deterioration. This condition continued practically until the war years, when limitations on manpower and material made construction impossible.

Now, in the postwar period, with money finally available, state highway departments are still beset with problems. Labor and material costs are extremely high. It is estimated that some projects are costing up to 65 percent more than in 1940. Many materials are scarce. It takes some states six months to a year to obtain shipments of structural and reinforcing steel after placing the order. There was an extreme shortage of cement in 1946, and repair parts and new equipment are still difficult to obtain. There is a serious shortage of railroad cars, and lumber is very scarce.

The labor situation is unstable, both as to working conditions and wage scales. In many localities there is still an extreme shortage of labor. Operating efficiency has been reduced to the point where it is a critical factor in obtaining fair prices for highway construction.

A number of states have been forced to consistently reject bids on construction projects because of high cost. In Virginia, over 20 percent of the bids received in 1946 were rejected for this reason.

Almost all states lack sufficient engineering personnel to make surveys, prepare plans, and execute the necessarily large program of work.

Financing this huge program is also a problem in many cases. The Federal-Aid Highway Act of 1944 authorized an appropriation of $500,000,000 in each of the first three fiscal years following the war to assist the States in a three-billion dollar post-war highway program. Funds apportioned among the States for each fiscal year are available for use over a two-year period. They may be expended for improvements on the regular Federal-aid system, for work on sections of the Federal-aid system in urban areas, and for the development of a Federal-aid system of secondary roads in each State. The money for the first post-war year must be obligated by contract by July 1, 1947, or these funds will lapse. Unless this time limit is extended by the new Congress, many states will lose a great opportunity due to the difficulty in placing contracts at reasonable prices. Some states are having trouble in matching their funds dollar for dollar, as is required by the law. Vermont stands to lose nearly $3,000,000 in Federal highway money in the next two years unless additional revenue is raised.

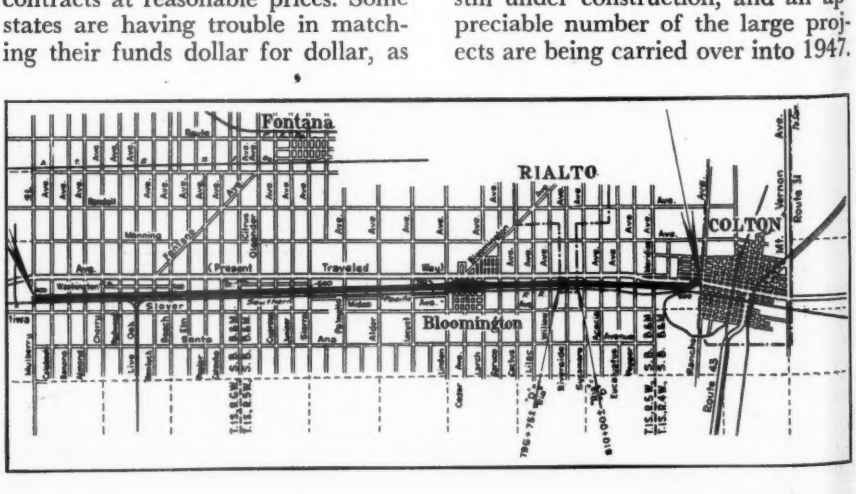
Partly as a result of this difficulty, many 1947 state legislatures will seek to abolish the practice of diverting gasoline and other automotive tax receipts to non-highway purposes. More than $2,000,000,000 of automotive tax receipts have been diverted to general government uses, and until this is stopped, observers predict a strong resistance to present attempts to raise these taxes above their present levels.

Texas approval, at the recent election, of a state constitutional amendment restricting the use of highway-user taxes, brought to 19 the number of states which have amended their basic laws to curb the diversion practice. However, a number of states have practiced highway fund diversion for so long that it is now part of their fiscal structures, and could not now be eliminated without substitution of new general taxes.

Taken state by state, the highway construction picture is encouraging. There is a universal demand for more and better highways, which, combined with the pent-up replacement demand, will surely give us a number of years of capacity construction to look forward to.

An average of $20,000,000 per state per year for five years could well be spent by most states on their highway systems. This optimum figure would mean an annual expenditure of $960,000,000, or a total of $4,800,000,000 for the five years. More would necessarily be spent by some states.

California At the end of 1946 the total value of contracts awarded and advertised by the department of public works amounted to more than $75,000,000. Most of the contracts awarded are still under construction, and an appreciable number of the large projects are being carried over into 1947.



• Figure 3—Highway No. 99 Freeway, entering Colton, Cal.

On January 1, 1947, there remained $30,000,000 in projects, originally scheduled for the first two postwar years, and not yet put under way. It is expected that most of this work will be advertised for bids prior to June 30, 1947, with the possible exceptions of bridges and grade separation structures involving structural steel. Certain other projects, particularly in the metropolitan areas of Los Angeles and San Francisco, are stymied by the reluctance of the state department of public works to clear construction sites because of the housing shortage.

A long range highway construction program costing more than $2,800,000,000 was recommended to the 1947 California legislature in December, by a joint legislative fact-finding committee. The group asserted that an aggregate expenditure of at least $2,819,853,000, between July 1, 1945 and June 30, 1959, will be required to move existing traffic economically, safely and conveniently. The committee estimated that revenue at the current rate would fall $957,071,000 short of the total needed, and urged higher gasoline taxes and increased levies on heavy trucks.

Advocates of this huge building program envisioned the construction of an expressway system totaling 2,970 miles in length. These expressways would connect the major centers of population, and would be supplemented by a state trunk line system totaling 8,545 miles.

Part of the overall express highway plan is already under construction, and other parts are already in use. The new U. S. highway No. 99 Freeway is now under construction by the Griffith Company Contractors between Colton and Ontario, California. The new Freeway parallels the old route No. 99 between these two towns, and is unique in the fact that its construction is running far ahead of schedule. When complete this new expressway will eliminate one of the most hazardous sections of highway in California. Ultimately the entire highway from Colton to Los Angeles will become a high-speed freeway, and will join with the Pomona freeway to go on into the heart of downtown Los Angeles. (See Figure 3, map of Route No. 99).

Pennsylvania During 1946, the Pennsylvania Department of Highways authorized and placed under way work totaling more than $65,000,000 for construction, reconstruction, resurfacing and widening. On this program the actual expenditures will approximate $35,000,000.

Including a $30,000,000 carryover from 1946, the financed program for 1947 may total $137,000,000. The awarding of contracts in 1947, as well as the amount spent, will depend entirely on the ability of the highway industry in Pennsylvania to absorb the program.

The programs contemplated are the largest in the history of the state, but the requirements are still greater, due to age and obsolescence of existing highways and streets.

Traffic bottlenecks in and adjacent to the urban areas present a problem which will require many years to solve in this state, with existing revenues. One of the most important projects of this class now under construction in Pennsylvania is the Penn-Lincoln Parkway, which leads into Pittsburgh from the east.

New York New York State is now engaged in the greatest program of highway construction and reconstruction ever undertaken by any state in the nation. Between VJ-Day and the end of 1946 the state had placed under contract projects having a combined value of more than $56,000,000. This is but a start on the overall $840,000,000 program, which is scheduled for completion by 1951.

Many major types of construction are included in this program, which will be advanced in 1947 just as rapidly as the construction industry is able to overcome the limitations resulting from shortages of equipment and critical materials, and absorb the work.

First will come the rehabilitation of the existing state highway system. Those portions of the system that do not conform with modern engineering and safety standards, and are inadequate for modern traffic needs, will be reconstructed as quickly as possible.

The highlight of the New York State program is the construction of the "Thruway," a superhighway 486 miles in length that will connect the two great port cities of New York and Buffalo with the intervening communities of Albany, Schenectady, Syracuse and Rochester, and link Buffalo with the Pennsylvania border near Erie. Work has already been started on this "greatest highway in the world". There will be no traffic lights or intersections at grade on this superhighway, which will have multiple-lane arteries separated by a broad mall, and easy curves and grades. (See Figure 4.)

Work will also begin, in 1947, on the construction of the State's new system of urban arterial routes, important new highways that will be constructed through cities at state expense, to overcome the traffic congestion which now threatens the well-being of the individual communities.

• Figure 4—A typical highway grade crossing elimination on the NewYork Thruway, showing a two-lane highway passing over.

Plans are now complete for the construction of at least $8,000,000 worth of "farm-to-market" highways throughout the state before the end of 1947.

All told, New York hopes to place another $200,000,000 worth of work under contract in the next twelve months. Plans are complete and ready to let out for this much work, and more paper work is being completed every day. The speed with which New York has been able to advance its program is due to the fact that it had on hand at the close of the war a postwar reconstruction fund of more than $500,000,000, saved from revenues that ordinarily would have been applied to reconstruction work, had not war restrictions made this impossible. These accumulated funds should enable New York State to complete its program on a "pay-as-you-go" basis, without the necessity of resorting to bond issues.

In 1945, the New York State Department of Public Works awarded contracts for construction or reconstruction of 216.1 miles of state highway at a total cost of $13,313,871. Awards in 1946 totaled $54,858,335 and covered 423.4 miles of highways, parkways, throughways and city arterial work, as well as 1.18 miles of grade crossing elimination projects. In addition there were completed in 1946 a total of 66.4 miles of highway at a cost of $2,685,199.

Texas In 1946, approximately $35,000,000 was spent for construction work in Texas. Nearly $50,000,000 is now under contract, and it is expected that this work will be completed in the next twelve months.

The state's programs of work utilizing Federal funds from the 1944 highway act are being placed under contract at the rate of $5,000,000 a month. Sixty-five percent of the funds available for first year construction from this source are now under contract. Approximately 15 percent of the second year's funds are also under contract. The third year program has been submitted to the Public Roads Administration, and early approval is expected. The major portion of the funds available from the three-year program will probably be under contract by the end of 1947.

A rather extensive program of expressway construction is now under way in the major cities of the state, and $4,000,000 of such work is now under contract in Houston, Dallas and San Antonio. A considerable volume of this type of work will probably be placed under contract within the next few months.

Georgia Highway construction contracts in the amount of $32,000,000 were let by the State Highway Department of Georgia in the year 1946. Approximately $22,000,000 of this total will be carried over into 1947. The probable expenditure for 1947 is $32,000,000.

Indiana State highway mileage completed in 1946 totaled 584.32 miles, which cost $7,325,224. Carried over into 1947 were contracts for an additional 424.87 miles of road, which will cost $20,665,256.

The mileage completed can be itemized as follows: stone or gravel surfacing, 18 miles, cost $761,659; surface bituminous treated, 327 miles, cost $626,652; mixed bituminous surface, 4 miles, cost $32,226; portland cement concrete, 20 miles, cost $1,415,977; sheet asphalt, 214 miles, cost $3,868,694. Twenty-five bridges were built, at a total cost of $620,016.

Carry-over contracts involved the following mileage and costs: Graded and drained, 9 miles, cost, $962,558; stone or gravel surfacing, 44 miles, cost, $1,696,385; bituminous surface treatment, 5 miles, cost, $320,424; mixed bituminous surface, 6 miles, cost, $53,648; portland cement concrete, 94 miles, cost, $8,886,205; other asphalt surfaces, 266 miles, cost, $6,063,455. Forty-nine bridges and one grade crossing separation were carried over, at a cost of $2,610,066 and $72,518, respectively.

In 1947, 41 miles will be surfaced with stone or gravel, at a cost of $2,343,800.

Also, 386 miles will receive bituminous surface treatment, which will cost $1,338,359; bituminous penetration will be used on 8 miles of highway, at a cost of $69,181. Portland cement concrete roadways will be constructed for 130 miles in 1947, which will cost $14,425,348. Sheet asphalt will be used on an additional 328 miles, and will cost $7,423,469. Sixty-two bridges will be built, at an estimated cost of $6,850,000, and nine grade crossing separations, cost, $1,750,000. Twenty-three miles of roadway will be graded and drained, and this will cost approximately $1,982,000.

The state highway department felt that more projects would be started if funds became available.

Ohio In Ohio $27,500,000 in contracts were let in 1946. These agreements covered 50 miles of hard surface construction, 2,300 miles of bituminous construction, and 117 miles of traffic-bound road. Also included in the total is the cost of 5 miles of graded and drained construction and 60 bridges.

New construction and major reconstruction in 1946 amounted to $18,500,000. To modernize and resurface existing roads, the state spent $5,825,000. Maintenance and surface treatment cost an additional $3,160,000. The state highway mileage completed in 1946, including certain contracts let in 1944 and 1945, is as follows:

Graded and drained, 7.5 miles, at a cost of $1,590,000.

Gravel surfaced, 117 miles, cost, $98,000.

Bituminous surface treated, 2,305 miles, cost, $2,831,000.

Bituminous concrete, 325 miles, cost, $5,960,000.

Portland cement concrete, 18.5 miles, cost, $3,337,000.

Thirty-seven bridges over 20-foot span, valued at $857,000, were also completed during the year.

A number of uncompleted contracts were carried over to 1947. They involved mileage as follows:

Portland cement concrete, 51 miles, cost, $10,174,000. Bituminous concrete, 113 miles, $3,700,000.

Contracts for 39 bridges over 20-foot span, valued at $2,050,000, were also carried over.

The Ohio Department of Highways was unable to give any information on state-financed projects for 1947 at this time, but was able to present the following information on federal-aid projects for 1947. (Types of construction have not been determined on all proposed projects at this early date, so it was necessary to classify the work as high, medium, or low type construction.)

High-type pavement and structures, 15 miles, cost, $15,000,000. Medium-type pavement and structures, 120 miles, $4,000,000. Low-type pavement and structures, 65 miles, $1,300,000. While this information includes several large contracts, the highway department felt that there was nothing now under construction that would fall under the classification of "unusual or outstanding".

The Ohio Turnpike Committee, with offices in Cleveland, and a membership including manufacturers, road contractors and labor representatives, is proposing five superhighways to crisscross the state. Two of the proposed expressways would follow different routes across Ohio to the Indiana state line, from a contemplated extension of the Pennsylvania Turnpike to the east.

Another would run from Cleveland to Cincinnati. A fourth super-road would link the Cleveland area with Erie, Pa., and the New York State Thruway. The fifth would run between Toledo and Cincinnati. These would be toll roads, and if constructed, their effect on surrounding states might well make construction of similar facilities necessary there.

Michigan Only $8,000,000 in projects were completed in Michigan during the year 1946, although over $25,000,000 in contracts were let during the year.

Another $25,000,000 of work will be placed under contract in 1947. This work will include some 20 structures on the Detroit expressways, and two bridges, one valued at approximately $2,000,000, and the other at $600,000. The state highway department declined to venture a prediction on 1948 commitments. In 1945 the state spent $1,500,000 for construction, not including maintenance.

Kansas Kansas started the 1946 season with a carryover of approximately $4,000,000 of previously-contracted construction work. During 1946 the state highway commission contracted for approximately $24,500,000 in work. There is a carryover into 1947 of nearly $15,200,000 in work. 1947 contracts are expected to total $27,000,000, not including carryover, and 1948 will probably see the same expenditure.

Oklahoma The estimated cost of projects under contract in Oklahoma is $23,162,552. In 1946, $3,986,153 was spent on maintenance, as compared to $5,412,398 in 1945. Expenditures for 1947 and 1948 are not available for publication at this time.

A controlled-access highway is under construction at the present time in the city of Ardmore. The project is 2.0 miles in length, and will cost approximately $750,000.

North Carolina The amount of contract work let by the North Carolina State Highway and Public Works Commission in 1946 involved 1,779.3 miles and totaled $21,568,400 in value. This work covered everything from retreatment to completely regrading the roadbed and placing concrete pavement.

In addition, using the state highway forces and equipment, North Carolina did 1047.7 miles of bituminous retreatment, placed 518.3 miles of new bituminous surfacing, and 8 miles of soil cement, for a total of 1574 miles. In this same period 8741 miles have been stabilized with soil-type base course, gravel, or crushed stone. The amount of material added to road surfaces under this stabilizing program is as follows: 1,109,655 tons of crushed stone from commercial quarries; 1,138,954 tons of crushed stone produced by state forces; 980,880 cu. yd. of soil type base course material; and 778,909 tons of sand. The weak links in the county road system were given first priority in the stabilization project. in most cases 1½- to 2-inch stone was placed on the existing roadbed, with sand and soil-type base course. it is expected that the amount of work let to contract in the year 1947 will be approximately the same as in 1946. From July 1, 1945 to Dec. 21, 1945, 450.8 miles were let, at a cost of $6,612,895.

Illinois The total cost of highway construction completed in 1946 in the state of Illinois was $12,398,817. In this total are included 1.7 miles of gravel or crushed stone surfacing, cost $67,271; 183.7 miles of bituminous mats and seal coating, cost, $774,083; 120.1 miles of bituminous concrete, cost, $3,438,778; 53.7 miles of portland cement concrete, cost, $4,514,695; and 12 bridges, cost, $1,184,715.

Contracts of $8,811,865 were carried over to 1947 for completion. Portland cement concrete, bituminous concrete and bridges accounted for the majority of carryover contracts.

The construction program for 1947 will consist of patching, widening and resurfacing existing pavements, and the construction of as much new pavement as is possible under present conditions. Every attempt will be made to obligate by contract the funds available under the Federal Aid Highway Act of 1944 for the first postwar fiscal year, as these funds will lapse July 1, 1947, unless the time limit named in the act is extended by Congress. This letting of contracts, however, will depend upon whether the bid prices received are reasonable.

During the latter part of 1946 aggregates were rationed to contractors in this state.

The state of Illinois will cooperate with the city of Chicago and Cook county by building a portion of the Congress St. superhighway connecting the Chicago lake-front with interstate highways in the western suburbs. (See Fig. 2.)

An Illinois Superhighway Commission, with authority to issue revenue bonds for the construction of toll superhighways, was created by a 1943 statute, since upheld by the State Supreme Court. No action to put existing plans into effect has been taken, but an appropriation must be obtained from the Illinois State Legislature in 1947 if anything is to be done within the next two years.

Connecticut Connecticut state highway modernization will cost 50 percent more than the estimates in the 1943 report of the Highway Advisory Commission, due to the effect of post-war price increases. Some part of the increase is caused by necessary project changes, but these changes account for but a small share. The increase moves the cost of the program from the original $67,000,000 to an estimated $99,000,000. A second part of the 1943 findings of the commission called for progressive improvements after the close of the first five years. These would have been developed as traffic neared or attained a peak of 50 percent over prewar levels. In this secondary program costs are now placed at $200,000,000. Of the gross $300,000,000 in both programs, $174,000,000 is listed for urban improvements.

All of the major improvements in the state road system are being planned by the highway department on the basis of detailed analyses of traffic movements, projected increases in vehicle use, and standards of design that will provide the maximum in efficiency and safety. (Since 1920, Connecticut traffic has increased 700 percent, and by 1950 it is expected to have increased by 900 percent.)

The most critical highway needs cited are those in the cities. The solution of many of these needs has long been delayed because many communities have failed to see that bold measures are essential if relief is to be obtained.

The question of financing and constructing large-scale urban highway improvements is not only a local problem, but one of Federal and national importance as well. The Federal Highway Act of 1944 specifically earmarked a part of the three-year funds for improvement of the Federal highway system in urban areas. In Connecticut this amounts to 54 percent of the funds, and with matching funds from the state, this will amount to about $18,000,000 for the three years.

City streets are unable to cope with the traffic burden developed

from entering state highways, as well as the traffic from the community itself, and this means that the State should carry out major improvements in the cities. To permit the free movement of traffic with maximum efficiency and safety, these improvements must be largely on new locations, and in the larger cities they must be developed as express highways.

In addition to the urban problem, there also exists the task of modernization of the rural state highways. The most urgent need in Connecticut is for the replacement of the old two-lane roads with four-lane highways. The state has at present a relatively large mileage of two-lane roads, and many of the more heavily traveled ones require additional lanes of travel. These improvements will be costly on the basis of miles constructed, but not on the basis of miles of travel or volume of vehicles.

The improvements will serve a large part of the State's traffic. Once completed, these arteries will provide the backbone of the highway system, with adequate capacities to accommodate anticipated increases in travel. The map (Figure 5) indicates details of the extensive construction program to be undertaken in the state.

Kentucky The Kentucky Department of Highways had 192 active projects under way in 1946, with a total contract value of $18,000,000. $11,000,000 of this work was completed during the year, leaving a carry-over of $7,000,000 to be completed in 1947. The department of highways expects the 1947 program to be as large or larger than the 1946 program. The first contracts for 1947 will be let on January 10, and contracts for the rest of the 1947 program will be let as soon as possible.

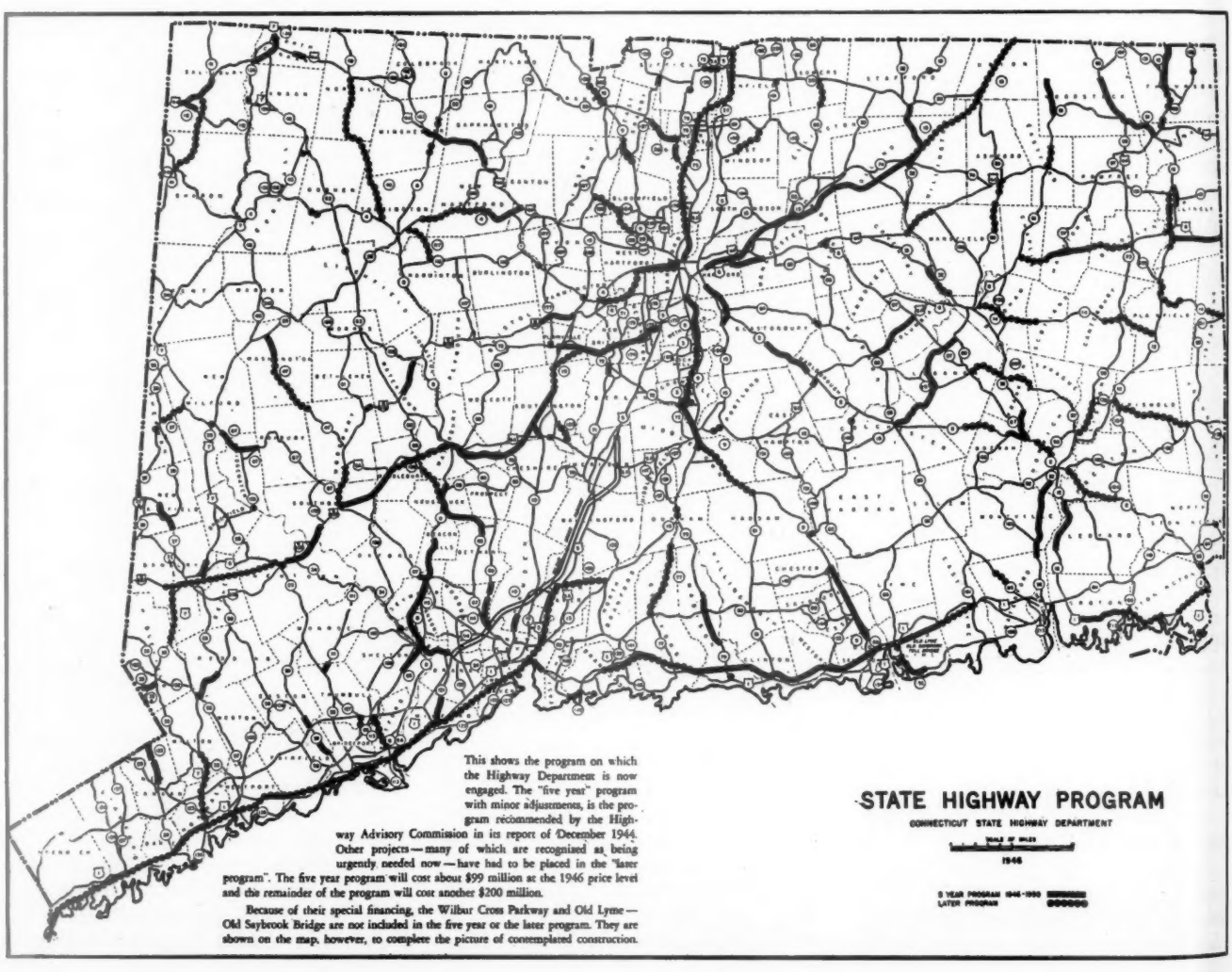
Virginia Seventy-three projects, totaling in value $17,934,000, were put under construction in the Commonwealth of Virginia during the calendar year of 1946. This amount represented 73 percent of the projects advertised. Approximately 20.8 percent of the bids received were rejected as being excessive. No reply was received on 6.2 percent of the work advertised in the year.

It is expected that approximately $40,000,000 in work will be put under way in the 1947 construction season. Included in this program will be sections of the Shirley Memorial Highway, extending southward from the Pennington network near Washington, D. C. This project will cost between $2,000,000 and $3,000,000. Improvements on Route No. 11 west of Salem will cost approximately $1,500,000. The bridge over the New River at Radford, Va., will be started in the 1947 construction season. This project is scheduled to cost in excess of $1,000,000.

New Jersey New Jersey is planning a new program of highway construction that will feature parkways and freeways incorporating the most modern engineering design for safety and continuous travel at regulated rates of speed. (See Figure 1.)

The legislature will be asked to appropriate at least $30,000,000 annually for a five-year period. A request will be made for a $42,770,000

• Figure 5


STATE HIGHWAY PROGRAM
CONNECTICUT STATE HIGHWAY DEPARTMENT
1946
5 YEAR PROGRAM 1946-1950
LATER PROGRAM
This shows the program on which the Highway Department is now engaged. The "five year" program with minor adjustments, is the program recommended by the Highway Advisory Commission in its report of December 1944. Other projects — many of which are recognized as being urgently needed now — have had to be placed in the "later program". The five year program will cost about $99 million at the 1946 price level and the remainder of the program will cost another $200 million.
Because of their special financing, the Wilbur Cross Parkway and Old Lyme — Old Saybrook Bridge are not included in the five year or the later program. They are shown on the map, however, to complete the picture of contemplated construction.

appropriation for the fiscal year 1947-48. Of this sum $35,130,000 will be requested from motor vehicle license fees and gasoline taxes, and $7,375,000 from a bond issue previously approved by the electorate. An additional $265,000 will be sought from motor vehicle funds for the construction of replacement bridges over the old Delaware and Raritan Canal.

In the total will be $10,000,000 for additional work on the Freeway and $7,700,000 for the Parkway. The bond money will be used for bridges, two of which are estimated to cost $2,500,000 each.

For the fiscal year 1945-46 the state highway department construction program cost $16,783,914 and for the fiscal year 1946-47 the cost is also $16,783,914.

Wisconsin In 1946 the state let $15,000,000 in contracts, and $4,500,000 of this work will be carried over into 1947, augmenting this year's program.

The 1947 program, part of a four or five year long range plan which includes Federal aid on 80 miles of state highway, will involve contracts for 397 miles of grading and draining, 59 miles of gravel surfacing, 140 miles of stone surfacing, 17 miles of bituminous surface treatment, and 269 miles of mixed surface treatment. In addition, 25 miles will be paved with bituminous concrete, and one mile with sheet asphalt. This will cost an estimated total of $20,800,000. Other miscellaneous work will bring the grand total of expenditures to $25,000,000 for 1947.

Iowa Since VJ-Day, Iowa has awarded contracts for 537.6 miles of road in the primary system, at a cost of $11,820,973. Further, contracts have been awarded for 1021.9 miles of farm-to-market roads, at a cost of $4,249,880. This means a grand total in value of contracts awarded of $16,070,853. Quite a substantial portion of this work has not been completed. It is considered probable by the State Highway Commission that contracts for additional work in the amount of $15,000,000 to $20,000,000 will be let in 1947. However, the commission did not care to speculate as to what the actual construction expenditures for this year might be.

South Carolina In 1946 the South Carolina State Highway Department spent $6,000,000 on highway maintenance and retreatment, $7,090,000 for road construction, and $1,700,000 for bridge construction. The Department anticipates an expenditure of $6,000,000 for highway maintenance and retreatment in 1947, and $15,500,000 for road and bridge construction.

South Carolina has a $42,000,000, three-year highway construction program now under way. The program is in its second year, yet the state has been unable to place as much new road under contract as was scheduled for the first and second years.

Maryland Forty-eight miles of modern highways were built in Maryland during the war, in addition to other work on access road projects to fill military needs. The completion of the access highway program, at a cost of $13,129,000, paid by the Federal government, relieved many formerly congested traffic areas in the state.

In 1946, contracts in the amount of $12,800,000 were let for new construction, resurfacing and betterment of the primary road system. Plans for 1947 will bring about the use of the available second-year funds of the Federal-Aid program, which provides Maryland with $5,492,808 for roads in the Federal Primary System, $5,370,243 for projects in the primary system in urban areas, and $3,511,545 for the secondary system on feeder roads.

Among the projects planned are the by-passing of the town of Marlboro on interstate Route 311, the relocation of several portions of the National Pike on Route 40 between Cumberland and Frostburg, and the elimination of several hazardous grade crossings.

Louisiana State highway construction and maintenance expenditures in Louisiana during the year 1946, as carried on under the Department of Highways, amounted to a total of $12,696,928. New construction work was limited, due to inability to secure right-of-way, and shortages of materials and labor. Maintenance costs increased due to efforts to restore the highways that deteriorated during the war years, and due to higher costs.

Construction work amounted to a total of $2,893,000, or about $500,000 more than was expended in 1945. Maintenance on 14,526 miles of highway cost $9,020,238 in 1946, an increase of 50 percent over 1945. This includes $1,438,587 covering 386 miles of road uncompleted and carried forward to 1947.

The amount of new construction work that can be let to contract during 1947 will depend to a large extent on the ability of the state to secure right-of-way, personnel, equipment and materials. Funds now available to the Department of Highways, including both state and Federal funds, total $92,891,061. It is estimated that $38,854,665 of the total available will be used for construction, maintenance, and operation in 1947.

New Mexico The state had hoped to award $12,500,000 in work in 1946, but managed to award but $11,000,000. Of this, $10,000,000 could be classed as new construction, and $1,000,000 as maintenance. New Mexico is just at the beginning of its road building needs, and the highway department hopes to program and construct $13,000,000 worth of work in both 1947 and 1948.

An interesting job now under construction in the state is on State Route No. 3 between Taos and Questa. 7.9 miles of road is being graded and drained only at this time, at an estimated cost of $714,271. Unclassified excavation in the amount of 828,400 cubic yards is being moved.

Mississippi The dollar value of contracts actually let by the State Highway department in 1946 was $10,900,000. $4,000,000 of this work was completed during the year. The 1947 program will involve approximately 572 miles of surfacing and structures, with a total estimated cost of $15,310,000. Maintenance cost was roughly $3,000,000 in 1946.

Minnesota Minnesota completed $10,890,000 in construction in 1946, including bridges, and carried over $3,870,000 in uncompleted contracts to 1947. The proposed state highway construction for 1947 will involve the expenditure of $21,700,000, including the amount spent on bridges. The work for 1948 will depend on the funds available, and definite information could not be given out at this time.

Some figures on construction in 1947 follow.

Certain contracts uncompleted in 1946 were carried over to 1947 as follows:

Grading, 153 miles, $3,200,000
Gravel base and mixed bituminous, 35 miles, cost $240,000
Pavement widening, 22 miles, cost $430,000.

The state highway department pro-

posed the following construction in 1947.

Graded and graveled, 477 miles, $10,000,000

Mixed bituminous, 220 miles, $2,500,000

Portland cement concrete, 90 miles, $4,500,000.

Grade crossing separation, nine in number, at a cost of $2,500,000.

Pavement widening, 85 miles, at a cost of $1,700,000.

Twenty-seven bridges are to be built at a cost of $500,000.

Missouri Under the provisions of the Federal Aid Highway Act of 1944, the State of Missouri receives approximately $14,400,000 a year, and must match that amount annually to have the use of the funds. The state has used only 22 percent of the first year's funds, and none of the second year's funds.

The remainder of the amount available under this act, plus prewar Federal funds in the amount of $4,501,355, frozen at the onset of World War II (plus that part of this money matched by the state), gives the State a potential program in excess of $50,000,000 in 1947, according to the State Highway Department. The department does not feel that this much will be spent in 1947, for a variety of reasons. For example, most of the bids on work after VJ-Day in 1945 were rejected as being too high, and approval has been slow since then.

The highway department awarded contracts in the amount of $10,683,988 up to December 1, 1946, and received bids on December 3 for approximately $4,000,000 worth of work. This probably was not approved in the calendar year 1946

Washington The Department of Highways of the state of Washington reports that only a start has been made on the program necessary to rehabilitate the state highway system to adequately serve traffic needs.

In 1945 the total awards on construction contracts were about $6,000,000, as compared with $10,000,000 in 1946 and a tentative construction program of $19,000,000 for 1947.

Due to the difficulty contractors have experienced in obtaining supplies and materials, there will be a carryover of approximately $7,500,000 in uncompleted contracts into 1947.

The 1948 program will depend upon legislative appropriations and highway revenue, but at least $20,000,000 per year will be needed for the next ten years.

A four-lane toll super-highway across the State of Washington, from the Puget Sound area to Spokane, was recently advocated by Gov. Mon C. Wallgren. Such a highway would link the shipping and industrial area of western Washington with the agricultural area on the eastern side of the state.

A proposed tunnel through the Cascade Mountains in this state has been under engineering study. Such a tunnel would reduce the climb and save on highway maintenance during the winter months. The tunnel, if built, would probably be in the vicinity of Snoqualmie Pass, where the State's present principal two-lane highway passes through the mountains.

Nebraska In the year 1946, the Nebraska state highway department awarded contracts for $8,404,500 worth of highway work. This consisted of the following: rigid type pavement, 49 miles; new bituminous pavement, 148 miles; bituminous pavement reconstruction, 142 miles; graded and drained, 330 miles; and 49 bridges over 20 foot span. The state expects to spend about $16,320,000 in 1947, including $12,000,000 for new construction and major reconstruction, $4,000,000 for maintenance, and $320,000 for new equipment. Both maintenance expenditures include about $800,000 for gravel resurfacing.

The 1946 contracts are about 80 percent complete, which will mean a 20 percent carryover to the 1947 season. Plans for 1947 depend largely on prices and conditions, but will probably be about the same as 1946, except that rigid-type paving will be curtailed.

Oregon A three year program of Federal-aid construction and state construction involving a total of $42,000,000, is now one-third under contract in Oregon. Construction expenditures for 1946 will amount to $8,000,000, exclusive of the purchase of right of way. The corresponding totals for 1947 and 1948 are expected to reach nearly $16,500,000 each year. An adequate program for modernization of the state highway system would cost at least $20,000,000 a year for construction.

Alabama The State Highway Department of Alabama had highway construction funds of $7,800,000 for the fiscal year 1946, which ended September 30. The department estimates that expenditures for the fiscal years 1948 and 1949 will be $18,000,000 each year, with approximately $250,000,000 needed for a ten-year program. No outstanding superhighways or bridges are now under construction in the state.

West Virginia As of November 30, 1946, the West Virginia State Highway Commission had outstanding road construction contracts with unexpended balances totaling $5,400,000. During the fiscal year 1945-1946, the state spent $7,600,000 on highway construction. The sum of $23,000,000 is available for the fiscal year 1946-47, and an additional $12,700,000 will be available for 1947-48.

As of November 30, 1946, there remained to contract from funds available in the year 1945-46, the amount of $6,300,000. The commission reports that the state actually needs to spend $20,000,000 annually for at least five years to improve secondary roads to an all-year travel basis.

Wyoming In 1946, according to the Wyoming Highway Department, the State let contracts for construction and major reconstruction in the amount of $7,500,000, covering a total of 450 miles of all types of road. An $8,000,000 program for 1947 will include many construction projects located in all sections of the state. Between four and five hundred miles of bituminous pavements, with all grading, draining, surfacing and bridges necessary, will be built under this program in 1947.

The Federal Aid secondary program covers approximately 150 miles of this, and the remainder will be under Federal Aid primary system. Much of the primary system mileage will be reconstructed on new alignment and grade.

In the past year, contracts for approximately 65 miles of reconstruction and betterment work have been let, at a cost of approximately $600,000. This work has been done without Federal aid.

Arizona Completed contracts for road construction in Arizona for the year 1946 amount to $3,100,000 for a total of 131 miles. Of this, 1 mile was gravel surface, cost $30,000; 125 miles were mixed bituminous surface, cost $2,560,000; and 5 miles were portland cement concrete, cost $510,000.

Uncompleted contracts carried over in 1947 totaled $3,800,000, cov-

ering 94 miles. Twenty-one miles of this were to be graded and paved at a cost of $800,000; 65 miles were to be mixed bituminous surface, at a cost of $2,900,000; and the remaining eight miles were to have been portland cement concrete, at a cost of $900,000. Plans deferred for lack of structural steel approximate $1,500,000 in contracts.

Arizona hopes to spend about $9,000,000 annually in 1947 and 1948 for similar work, but the state highway department estimates that these totals are but one-fourth of the actual need.

One section of Arizona highway, US Route No. 70 near Miami, is under construction in precipitous terrain, and will require a steel arch viaduct 115 feet above the canyon bottom, with the deck about 700 feet long. Another section of this same highway near Superior is being designed with a similar viaduct, and about 800 feet of tunnel, approximately 40 feet wide. The length of this project is 3 miles, and it will cost nearly $1,250,000.

Montana The Montana Highway Commission let $6,900,000 in contracts in the year 1946. The anticipated expenditure for 1947 will be approximately $13,000,000. The present program does not include any outstanding projects, such as superhighways, or large bridges. The 1948 program calls for an expenditure of $13,000,000 and the state spent $2,900,000 in 1945.

Nevada During the calendar year 1946, the Department of Highways of the state of Nevada placed projects under contract for a total of 250 miles of construction, at a cost of $5,715,000. Seventy-five miles have been completed in the year, at a cost of $1,945,000. This leaves a carry over in 1947 of 184 miles costing $3,570,000. The highway department has 240 miles of highway programmed for construction in the calendar year 1947, at a cost of $5,200,000.

Utah In the year 1945 the State Road Commission of Utah spent $1,234,000 for construction, and $1,970,000 for maintenance. The corresponding figures for 1946 were $2,900,400 for construction and $2,112,000 for maintenance. For 1947 and 1948, an estimated $7,450,000 and $8,250,000 will be spent for construction, and $2,500,000 each year for maintenance. These estimates for 1947-48 are based upon an increase of $2,000,000 in each year over amounts provided by present laws.

Maine The State Highway Commission awarded work in the amount of $4,100,000 in 1946 to Maine contractors. Approximately $2,120,000 in work was constructed in 1946, leaving $2,460,000 in projects to carry over to 1947. The Maine 1947 program has not yet been determined.

The Maine Turnpike Authority is constructing a four-lane divided highway between Kittery and Portland. Grading was started in 1946, and paving work is expected to begin in 1947. This turnpike is to be a toll road, and is financed by a $15,000,000 bond issue, which was sold by the Authority in 1946. Eventually, under authority granted by the 1945 Maine legislature, it is planned to extend this toll facility from Kittery to Fort Kent, at a total cost of more than $100,000,000.

Colorado Projects placed under contract in 1945 and 1946 by the Colorado State Highway Department amount to $6,300,000, divided into categories as follows: Graded and drained, 19.8 miles; gravel surfacing, 131.8 miles; oil processed surfacing, 28.7 miles; concrete pavement 0.1 miles. Twenty-seven bridges and 13 railroad grade crossing signals are included in this total.

The 1947 construction is estimated at $18,000,000, and a similar amount will probably be placed in 1948. These future programs may be increased if two-cent increase in the gasoline tax is approved by the state legislature. Approximately $4,000,000 in additional construction per year would result from the additional funds, which would more nearly meet the actual construction needs of the state.

Colorado is planning a 5,100-foot tunnel to pass under the Continental Divide on U. S. 6 west of Denver. The north-south route east of the Rocky Mountains, the Denver Valley Highway, is being progressively improved from the Wyoming border to the New Mexico state line. A four-lane freeway is being planned, which will run from Denver to Greeley.

North Dakota The North Dakota State Highway Department reports that $3,000,000 of contracts for construction have been let since VJ-Day, but that progress has been poor. The state hopes to let approximately $6,000,000 in construction contracts in 1947, and has a still larger program in mind for 1948 if conditions improve. The department stressed the need for a considerable yearly construction program in the state.

Rhode Island In 1946, Rhode Island had available $1,000,000 in state funds and $1,300,000 of Federal Aid funds. No 1947 appropriation has been made as yet, as the state legislature did not convene until January 1. Rhode Island has approximately $3,000,000 in work on paper which could be advertised on short notice.

No outstanding projects are under way in this state at the present time.

South Dakota The highway commission let contracts in 1946 for over $5,000,000, but work completed totaled only slightly over $2,000,000. No estimate was made on 1947 construction. No superhighways are planned in this state.

Vermont Since the end of the war the Vermont Department of Highways has awarded contracts for 21 miles of road and 19 bridges, totaling in cost an estimated $2,358,154. Of this total, Federal Aid will pay $1,203,658, and state funds $1,154,496. State forces have placed an additional 69 miles of road under construction, representing $577,763. Provided that state funds are available to match available Federal aid, future construction expenditures in Vermont will amount to approximately $3,000,000 in 1947 and $4,000,000 in 1948. However, increased state revenue will have to be provided to take care of actual construction and deferred maintenance needs.

Massachusetts The Department of Public Works of the Commonwealth of Massachusetts submitted the following information on the construction program in that state for the fiscal year 1947, July 1, 1946 to June 30, 1947. The following data does not include reconstruction and maintenance of city and town roads, for which some state funds were expended. For the fiscal year 1945, approximately $320,000 was expended for construction and reconstruction. In 1946, approximately $930,000 was expended for this type of work.

A large long-range construction program is now under way, with a planned expenditure of $250,000,000 in the next ten years. About $28,000,000 will be expended in 1947 and $20,000,000 in 1948. A few of

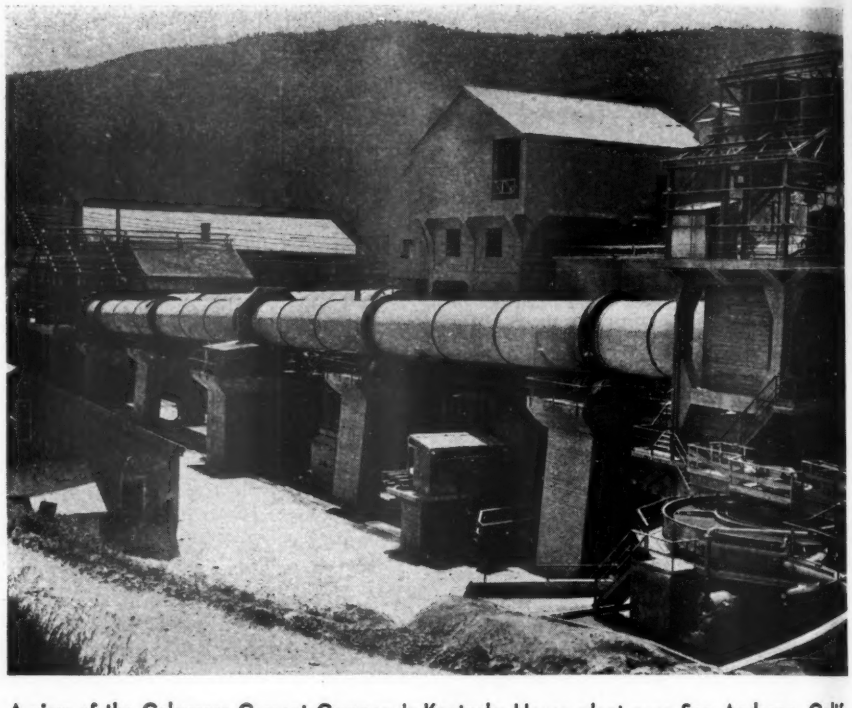
(*Continued on page* 135)

U. S. CEMENT INDUSTRY EXPANDING TO MEET APPARENT FUTURE PEAK DEMANDS

IN spite of the many handicaps under which the cement industry in the United States, Puerto Rico and Hawaii operated in 1946, production far exceeded the wildest expectations at the beginning of the year. No complete figures are yet available but it seems certain that the actual production was about 163,000,000 bbl., about 58 percent over the 1945 volume of 102,804,884 bbl. and only 11 percent under the 1942 record volume of 182,759,000 bbl. The chief handicaps were: fuel shortages during the two coal strikes which caused many plants to shut down or curtail production drastically; the railroad strike and a serious car shortage, especially during the latter part of the year, which held up vital shipments of gypsum; strikes in cement plants which shut some of them down during periods of peak production; shortages of and delays in the delivery of equipment and supplies for replacement or plant expansions, most of them due directly or indirectly to the coal, steel, railroad and other strikes; a shortage of labor and high turnover, especially of the semi-skilled type needed by the cement industry.

Cement shipments in 1946 totaled about 170,000,000 bbl., about 62 percent over the 1945 volume of 106,353,595 bbl. and also far in excess of the most optimistic estimates at the beginning of the year. In spite of this shipments fell far behind the demand for most of the year, to such an extent that sporadic black markets developed in some areas. One reason for this demand was the high volume of housing construction, in spite of restrictions, which caused a mushroom growth of concrete block plants throughout the country. In some areas these new plants were unable to obtain adequate supplies of cement and were forced to shut down or curtail their operations. The shortage of freight cars also held down shipments to some extent in spite of a growing use of long-distance freight trucks.

Stocks on hand at the mills dropped off rapidly during the year as demand outstripped the ability to produce and at the end of the year they probably reached the lowest levels in recent history. Stocks actually dropped from about 16,000,000 bbl. in January, 1945, to about 7,800,000 bbl. on November 31 and, at the rate they were being depleted may have dropped as low as 7,000,000 bbl. by the end of the year.



A view of the Calaveras Cement Company's Kentucky House plant near San Andreas, Calif., showing the new kiln.

FUTURE PROSPECTS

Definite prospects for 1947 are uncertain because of the many as yet uncontrollable factors entering into the economic picture but it is certain that it will be the biggest year in history, barring some unforeseen national or world catastrophe. The national construction picture, as described in detail elsewhere in this issue, indicates the biggest construction year in U. S. history and this, coupled with the growing use of concrete in place of other building materials, makes it evident that the demand for cement in 1947 will be by far the greatest in history.

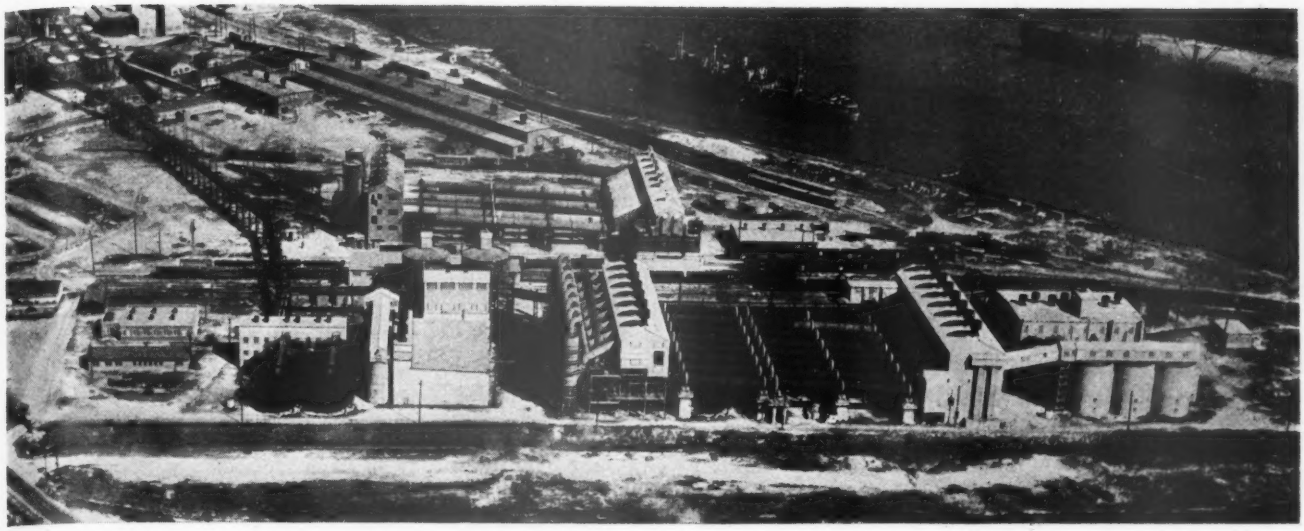
Whether or not the industry can produce enough cement to meet the demand depends on many factors including labor conditions, freight car and coal supply, availability of processing equipment, speed of completion of expansion and improvement programs, etc. The industry begins the year with the serious handicap of a very low inventory, not only at the plants themselves, but also in the stocks in the hands of contractors, concrete products and ready-mixed concrete producers, dealers, etc. It seems certain, however, that portland cement production will exceed the previous 1942 peak, but by how much is now anyone's guess.

CHANGES IN PRODUCTION FACILITIES

There was little change in production facilities in 1946 as most expansion programs did not get under way until well into the year and their completion is being delayed by serious equipment and supplies shortages, again largely due to strikes. Described in this article are some of the many important programs under way or definitely planned but these represent only a part of the total. Many companies are holding their plans in abeyance until the labor and equipment conditions stabilize. Many others with important plans, some of them well under way, are temporarily withholding publicity.

GAINS

No completely new plants went into operation during the year in continental United States although clinker production is reported to have begun on one kiln of the Ideal Cement Company's plant at Mobile,



Alumina plant at Mobile, Ala., which is producing cement and supplying equipment for new plants and expansions of Ideal Cement Co.

Ala., an alumina plant which is being converted. A small new plant in Hawaii, that of Hawaiian Gas Products, Ltd., Honolulu, did contribute to the total.

Only a few of the many extensive expansion programs under way were completed in time to add to the 1946 output and most of these involved the installation of used kilns and other equipment.

Calaveras One of the first important programs completed was that of the Calaveras Cement Co., near San Andreas, Calif. Early in 1946 this company completed the installation of a 11¼- by 360-ft. Allis-Chalmers kiln which was purchased from a DPC manganese plant in Nevada. This added 3,500 bbl. to the plant's daily output and it now has a total capacity of 2,250,000 bbl.

The new kiln was installed parallel to the two old 240-ft. kilns and is connected to the same Cottrell precipitator. Clinker is discharged into a new Fuller inclined-grate cooler. Equipment was also added in other departments.

Penn-Dixie The Pennsylvania-Dixie Cement Corp., completed the major part of its postwar improvement program when it improved the kiln and coal-grinding departments of its plants at Clinchfield, Ga. and Richard City, Tenn. The installations included unit coal mills, clinker coolers, closed-type hoods and the most modern controls for each of the kilns at Clinchfield and Richard City. Additional cement storage silos and Fuller-Kinyon conveying systems were also installed. The major items of new equipment were Kennedy-Van Saun air-swept coal tube mills, Multiclone dust collectors, and Fuller inclined-grate clinker coolers.

LOSSES

No existing plants were actually dismantled during the year but two which had contributed steadily to the output of the industry in earlier years were discontinued.

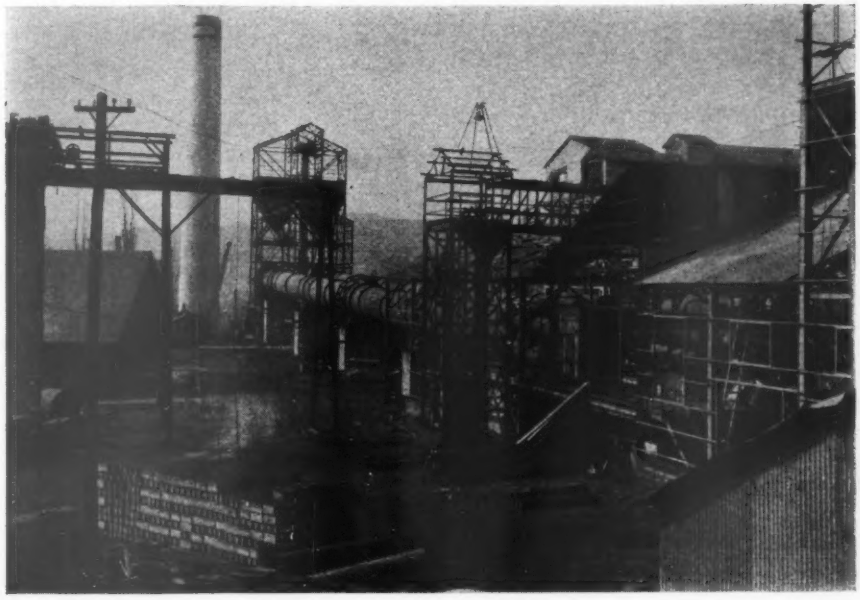
Cowell The 2,000-bbl. daily capacity of the Cowell Portland Cement Co., Cowell, Calif., was shut down late in 1946 due to the exhaustion of its limestone deposit. The quarry was actually closed down in February but enough material was on hand at the plant to keep it going until late in the summer. The Cottrell precipitator from this plant has already been dismantled and is being installed in another plant. This plant had an annual capacity of 1,500,000 bbl. Dismantling of the plant is under way.

Near completion are the two new 314-ft. dry-process kilns being installed at the Siegfried, Pa. plant of the Lawrence Portland Cement Company.

Washington-Idaho The Washington-Idaho Lime Products Co., after over 10 years of steady operation, suspended operations at its Orofino, Idaho, plant after an injunction brought by neighboring property owners claiming a dust nuisance. At the time it was stated that the plant might be moved to another state. This plant has a daily capacity of 600 bbl.

MILL PRICES

Mill prices for cement are up somewhat from pre-war figures but increases are far below the increased cost of labor, equipment and other factors entering into cement production. Under OPA slight increases had been granted to producers in various parts of the country, a few of them in 1946 before decontrol went into effect. Increases since



made by the industry have been moderate and far less than those for most other building materials and most other products. As a result, however, prices are now at a level which will make possible profitable operation of most cement plants during 1947, and which will justify expenditures for the tremendous volume of needed plant improvement which has been building up for many years.

Details of Programs Under Way or Contemplated

Ideal Much has been published in recent months about the $10,000,000 new plant and improvement program being undertaken by the Ideal Cement Co. of Denver, Colo., with which are affiliated the Colorado Portland Cement Co., the United States Portland Cement Co., the Union Portland Cement Co., the Nebraska Cement Co., the Arkansas Portland Cement Co., the Three Forks Portland Cement Co., the Oklahoma Portland Cement Co., and the Gulf Portland Cement Co., operating a total of eight portland cement plants. The only plants not affected by this program are the ones at Boettcher, Colorado and Superior, Nebraska, which are considered to be well balanced and adequate for the demands of the areas they serve. Work is under way at all the other plants. When completed the capacity of the Ideal chain will be increased by 4,200,000 bbl. per year.

This vast program is based on the acquisition in May, 1946 of the government-owned alumina plant at Mobile, Ala., which is supplying most of the equipment for this program. This plant had eight 9½- by 250-ft. kilns.

At Portland, Colo., (Colorado) and at Devil's Slide, Utah (Union) new plants are now under construction. The new plant at Portland will have added capacity of 1,200,000 barrels annually, while the new plant at Devil's Slide will have 1,000,000 barrels. Each plant will have two 9½- by 375-ft. kilns.

At Ada, Okla. (Oklahoma) one raw mill and new slurry tanks are being installed which will enable full utilization of the kilns at that plant and should increase production approximately 300,000 barrels per year.

At Houston, Texas, (Gulf) it is planned to install a 250-ft. kiln from the Mobile purchase together with new raw and finish mills and auxiliary equipment. The increased capacity at that plant will be 400,000 barrels per year.

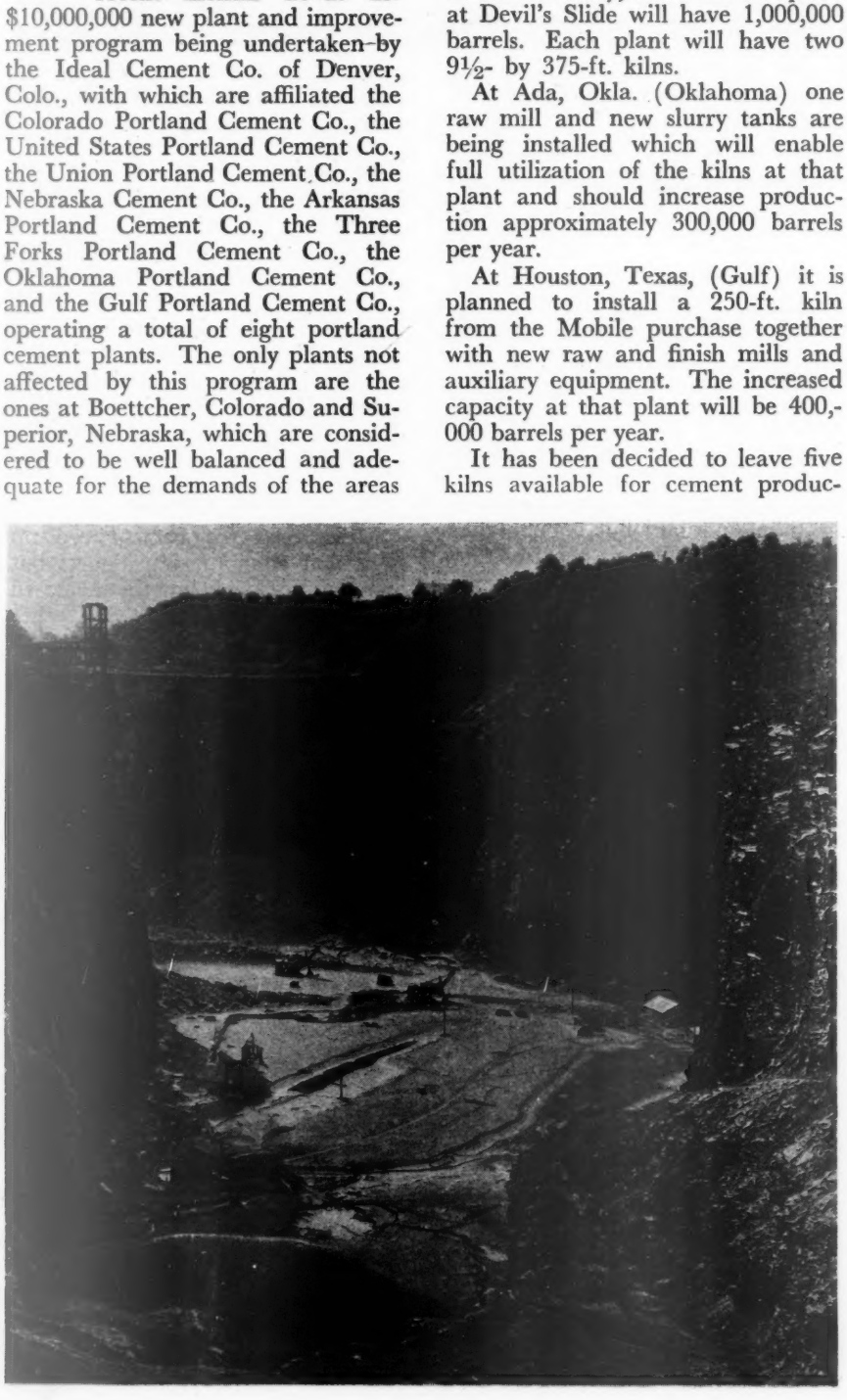
It has been decided to leave five kilns available for cement production at the Mobile plant instead of the two originally planned, until the demand in that area abates. The increase in production above what was originally contemplated at Mobile will be 850,000 barrels.

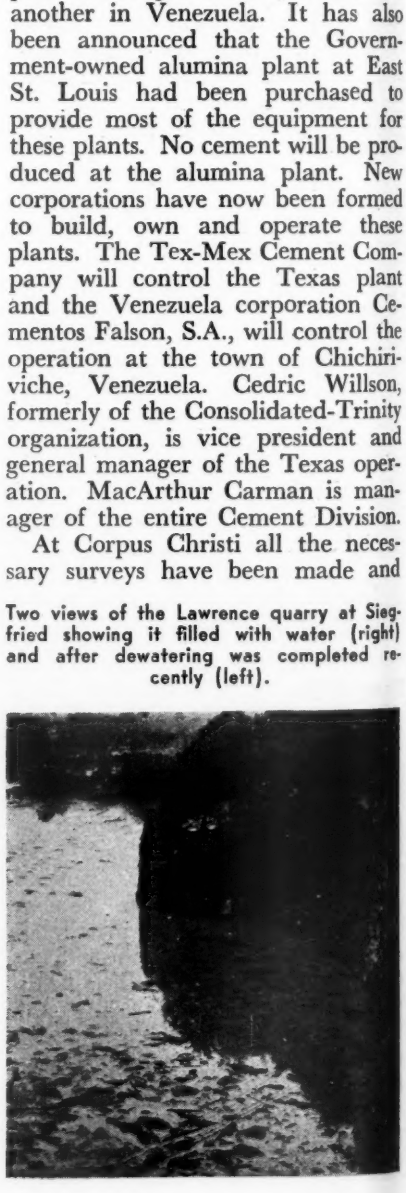
At Okay, Ark. (Arkansas) it is planned to install one of the kilns from the Mobile purchase. Present grinding capacity is adequate to take care of this additional kiln without change and the increased capacity will be at least 250,000 barrels per year.

At Trident, Montana (Three Forks) likewise, the grinding capacity is being increased to balance kiln capacity and additional production of 200,000 barrels per year will be developed.

Tex-Mex The Cement Division of Erle P. Halliburton, Inc., Los Angeles, Calif., has received much publicity since it announced its intention to build a new cement plant at Corpus Christi, Texas and another in Venezuela. It has also been announced that the Government-owned alumina plant at East St. Louis had been purchased to provide most of the equipment for these plants. No cement will be produced at the alumina plant. New corporations have now been formed to build, own and operate these plants. The Tex-Mex Cement Company will control the Texas plant and the Venezuela corporation Cementos Falson, S.A., will control the operation at the town of Chichiriviche, Venezuela. Cedric Willson, formerly of the Consolidated-Trinity organization, is vice president and general manager of the Texas operation. MacArthur Carman is manager of the entire Cement Division.

At Corpus Christi all the necessary surveys have been made and





Two views of the Lawrence quarry at Siegfried showing it filled with water (right) and after dewatering was completed recently (left).

the necessary property acquired. The raw materials have been tested and orders for equipment are being placed as rapidly as possible. Active construction will begin early in January and the plant is expected to be in operation by the end of July 1947. Such rapid progress is possible because the alumina plant contains all the basic machinery, equipment, buildings, etc., necessary for the cement plant. Dismantling of the alumina plant is already well under way.

While the design of the two new plants is under the direct supervision of Mr. Carman, the actual engineering work is being done in St. Louis where temporary headquarters for the Cement Division have been established. Sverdrup and Parsel of St. Louis are doing the basic engineering work and Bartholomew & DeBruin of Houston are acting as cement consultants.

The Corpus Christi plant will be located on a piece of land between the Corpus Christi Harbor deep-water ship channel and Nueces Bay. This will make possible cement shipments by barge or large vessel direct from the plant. There are also adequate highway and rail facilities. The distribution of the cement will be partly through strategically-located storage and packing plants within economic shipping distance of the plant. Water shipments to these points will be made by company-owned self-unloading barges.

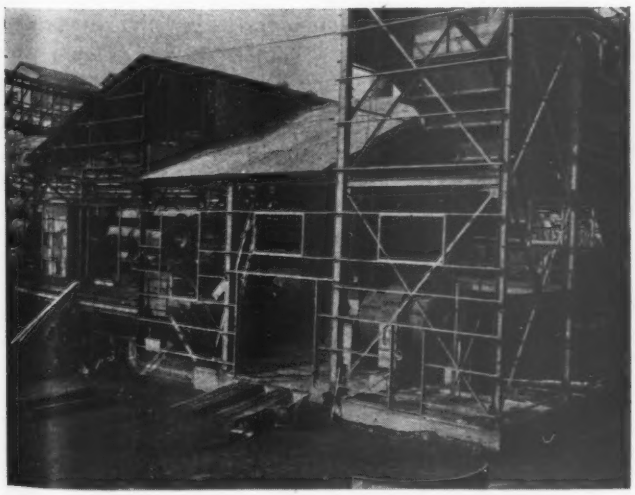
At Corpus Christi the basic raw materials will be oyster shell and clay. Proven deposits of oyster shell are available within a mile of the plant and will be dredged and delivered by contract. Abundant deposits of clay near the plant have been purchased and this will be excavated with a Sauerman drag scraper and fed to a wash mill. The clay slip will then be pumped five miles to the plant. The clay is very fine and will not have to be ground. As it forms about 36 percent of the raw mix this is an important economy. Gypsum and iron ore are readily available. Natural gas, which is plentiful and cheap, will be used as the major fuel. Power will be purchased from an adjacent public utility plant.

The plant will be a wet-process operation with a daily capacity of 4,000 bbl. It is being designed for flexibility to make possible the production of various types of cement, and for a minimum of manpower. The two 9½- by 375-ft. kilns will be equipped with chains, Fuller coolers and all modern control equipment. They will be connected to a Western Precipitation Corp. Cottrell precipitator and other collectors will be used wherever dust is created. The grinding departments will be located in the same building to save labor. Raw materials will be crushed to minus ½ in. before going to the raw mills. Wet raw grinding will be done with rake and bowl classifiers in a 2-stage closed circuit. The oyster shell and clay slurries will be stored separately to provide for maximum flexibility in blending. Each clinker mill will have three feeders so that masonry cement can be made. These mills will also be in closed circuit with air separators and Fuller-Kinyon pumps will convey the finished product to storage. The storage and packing plants will be of an entirely new design which, it is said, will have many advantages over present types.

Lawrence At Siegfried, Pa., the Lawrence Portland Cement Company has nearly completed the installation of two new kilns which will eventually replace four of its eleven old kilns. The new kilns are F. L. Smidth 9- by 314-ft. units equipped with Unax coolers and are said to be the longest dry-process kilns in existence. They tie in with the existing raw-grinding and storage facilities except that new raw-material storage tanks and feed screws were installed. The clinker is discharged to the same McCaslin conveyor which serves the other kilns. The remaining old kilns will continue to operate as long as the demand necessitates but three 150-ft. units and one 180-ft. unit have been removed. The new kilns are expected to produce about 100,000 bbl. of clinker per month, about the same capacity as that of the four old ones.

The new kilns are fired by Smidth Tirax coal mills and these get their coal from new bins. A fuel consumption of less than 80 lb. per bbl. is expected, a great improvement over the old kilns. Both new kilns are insulated for all but 90 ft. of their length. The control board is the usual complete Smidth unit with a telephone connecting both ends of the kilns. Separate Western Precipitation Multiclones collect the stack dust for these kilns ahead of the new 150-ft. Rust reinforced concrete stack.

This installation is remarkable in that it fits in perfectly with the balance of the existing plant, which is not to be changed, and its completion has also been perfectly timed with the tremendous job of cleaning out the quarry, which has just been completed. On July 9, 1945, a flash flood changed the course of a river and overnight filled the 260-foot-deep quarry with more than 1½ billion gallons of water, burying all equipment under thousands of tons of silt. Removing the water and silt turned out to be an engineering job



Below, left: Closeup of clinker coolers and direct-firing coal mills at Siegfried plant of Lawrence. Right: Closeup of kiln end and the attached coolers.

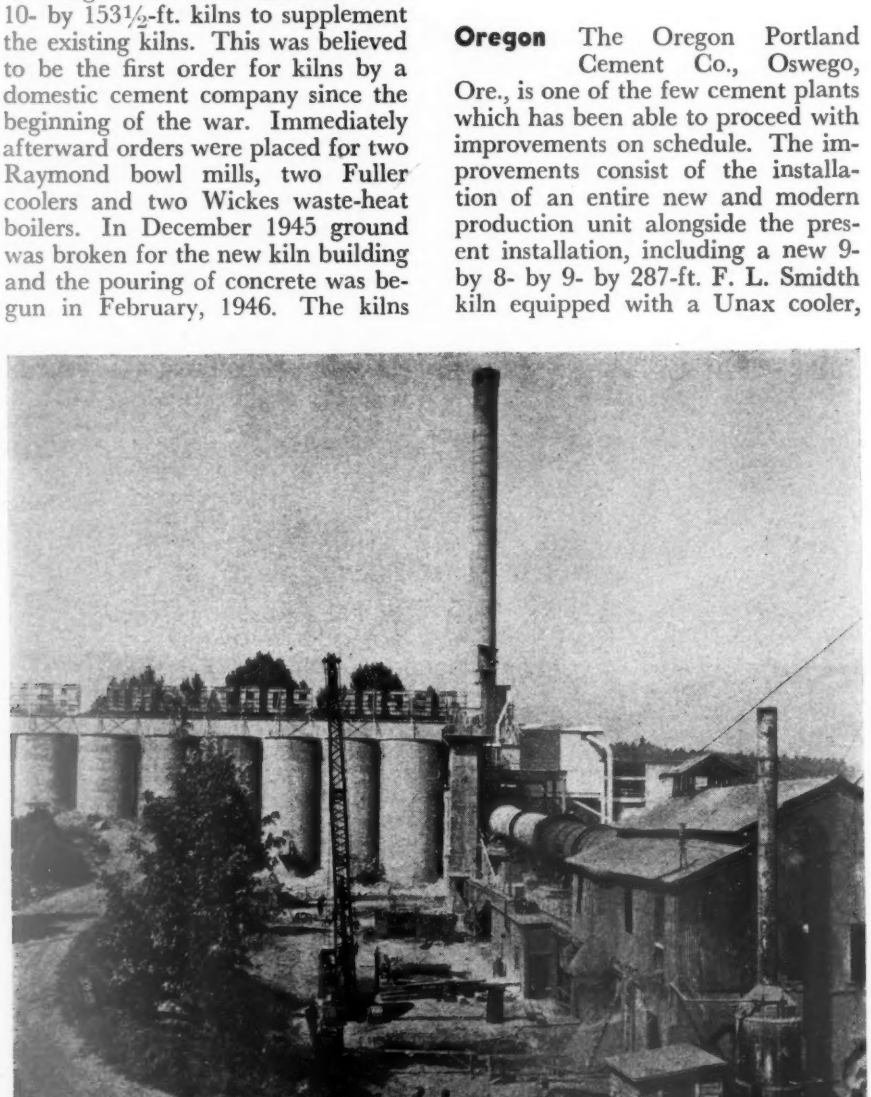
of the first magnitude and was carried out at a cost of over $150,000. The removal of the water was strictly a mass handling proposition but the silt remaining had to be allowed to settle and partially dry before it could be removed.

At Lawrence's Thomaston, Me. plant work is progressing on the improvement of the 130-ft.-deep quarry. The rail-haulage system has been replaced with diesel trucks and a new shovel will be added. Separate ramps are being built for the cement and lime plant stones which are on different levels. This installation is expected to be completed in about a year.

Huron The Huron Portland Cement Co., Alpena, Mich., in October 1945 inaugurated an extensive improvement program by ordering from Allis-Chalmers two 10- by 153½-ft. kilns to supplement the existing kilns. This was believed to be the first order for kilns by a domestic cement company since the beginning of the war. Immediately afterward orders were placed for two Raymond bowl mills, two Fuller coolers and two Wickes waste-heat boilers. In December 1945 ground was broken for the new kiln building and the pouring of concrete was begun in February, 1946. The kilns are expected to be installed early in 1947. The program provides for two more kilns to be installed in the near future and all footings and piers are being installed on this basis, as are also all buildings, conveying and elevating equipment and other accessories.

The raw-grinding capacity is to be increased by the installation of an additional 7- by 26-ft. Compeb mill operating in closed circuit with a 14-ft. separator, both of which are on order. The clinker-grinding capacity will be increased by the installation of two Bradley Hercules mills on order, which will discharge into three of the present tube mills, in closed circuit with air separators. It is also planned to install coolers on the six existing 10-ft.-dia. kilns and some of these have been ordered.

Oregon The Oregon Portland Cement Co., Oswego, Ore., is one of the few cement plants which has been able to proceed with improvements on schedule. The improvements consist of the installation of an entire new and modern production unit alongside the present installation, including a new 9- by 8- by 9- by 287-ft. F. L. Smidth kiln equipped with a Unax cooler, compartment mills of the same make, and crushing equipment. A Western Precipitation Corp. Cottrell precipitator is also being installed and new raw and finish grinding buildings and slurry basins are being built. The total cost of these improvements will be approximately $1,250,000 and they will increase the capacity of the plant from the present 1,150 bbl. daily to 3,000 bbl.



• Excavating operations for the foundation of a second kiln at the Oswego, Oregon, plant of the Oregon Portland Cement Company. The new kiln will be parallel to the present one at the right, but will be 287 feet long, 77 feet longer than the one now in use.

Riverside The Riverside Cement Co. has a number of improvement projects under way. The equipment ordered includes two new kilns, 9½- by 250-ft. and 10- by 300-ft., and two Fuller inclined-grate clinker coolers, 5- by 16- and 5- by 20-ft.

Permanente The Permanente Cement Co., Los Altos, Calif., said to be the world's largest plant, is undergoing further expansion which will increase output 10 percent to 5,500,000 bbl. These additions call for an expenditure of about $1,100,000 and include the installation of Fuller inclined-grate coolers on each of the four 465-ft. kilns, an additional raw mill, a third slurry storage tank, added clinker crushing equipment, etc.

In December the new $500,000 cement storage and packing plant in Seattle, Wash., went into operation. This has a capacity of 80,000 bbl.

Louisville The Louisville Cement Co., Speed, Ind., has a 3-year building program under way which will involve the expenditure of about $1,500,000. Included in the equipment to be installed are new boilers and the packing department is to be enlarged.

Dewey The Dewey Portland Cement Co. has an extensive program of modernization under way at its Davenport, Iowa plant. This includes a new packhouse and bag storage, increased trackage facilities, dust collectors, woven wire belting for the conveying of sacked cement, extension of the materials storage building, installation of an Edge-Moor stoker-fired boiler to supplement the present waste-heat boilers, 1,000-ft. extension of the river dock, Allis-Chalmers all-welded kiln ends, two Allis-Chalmers air-quenching clinker coolers, Merrick clinker Weightometers, etc. Remodeling of the crushing and screening department is near completion.

At Dewey, Okla., Buell dust collectors are being installed on the kilns.

Lehigh The Lehigh Portland Cement Co. is said to be still working on plans for the construction of a new $3,000,000 plant near Monticello, Minn. which will use marl as a raw material.

A 1200-hp. Nordberg diesel engine has been ordered to generate power for the Iola, Kans. plant.

At the Buffalo, N. Y. plant the installation of a Cottrell precipitator was completed. The shell for this unit was erected before the war.

At Sandt's Eddy the quarry is being converted from rail to truck haulage.

At Metalline Falls, Wash., improvements are being made to increase the output of high-early-strength, mortar and other special cements.

Universal Atlas The Universal Atlas Cement Co., New York City, has improvements under way at a number of its plants but conditions make it uncertain when these will be completed. It is reported that the installation of Cottrell stack dust collectors is under way at its model new plant at Northampton, Pa. The Osborn, Ohio plant, which was purchased from the Wabash Portland Cement Co. in 1945 has been reconditioned and went back into operation about the middle of 1946. A power plant is now being installed for generating all the electricity needed by this plant.

Marquette The Marquette Cement Manufacturing Company has a number of plans for expansion and improvements but most of these have not yet reached the announcement stage. It does, however, have under way a program of improvement at its Hawkeye plant at Des Moines, Ia., which is really a resumption of the extensive program partly completed before the war. This program involves the replacement of old cement storage houses with silos of 216,000-bbl. capacity to supplement the existing 150,000-bbl. silos. New packing, bulk-loading and sack-storage buildings will also be built.

Southwestern The Southwestern Portland Cement Co. during the year made some minor improvements at each of its three plants. At Victorville, Calif. Buell stack dust collectors were installed on three kilns and two more are being installed on a fourth kiln. At El Paso, Texas new grinding equipment was installed. At Osborn, Ohio a 65-ton diesel-electric locomotive was added to haul stone from the quarry to the plant. Further work will include the construction of a $60,000 repair and storage building.

Medusa The Medusa Portland Cement Co. in 1946 installed a 12-ft. Raymond separator in its white cement mill at York, Pa. to produce high-early strength and mortar cements. A new kiln is to be installed.

At Bay Bridge, O. a new power plant is under construction. Later it is planned to remodel this cement plant and install considerable new machinery.

Extensive improvements are under way at Dixon, Ill., including a new grinding department and rock storage silos. Changes are to be made in the present crushing plant and dust collectors are to be installed.

At Milwaukee, Wisc. nearly $100,000 is to be expended for a distributing plant to include six reinforced-concrete silos and packing facilities.

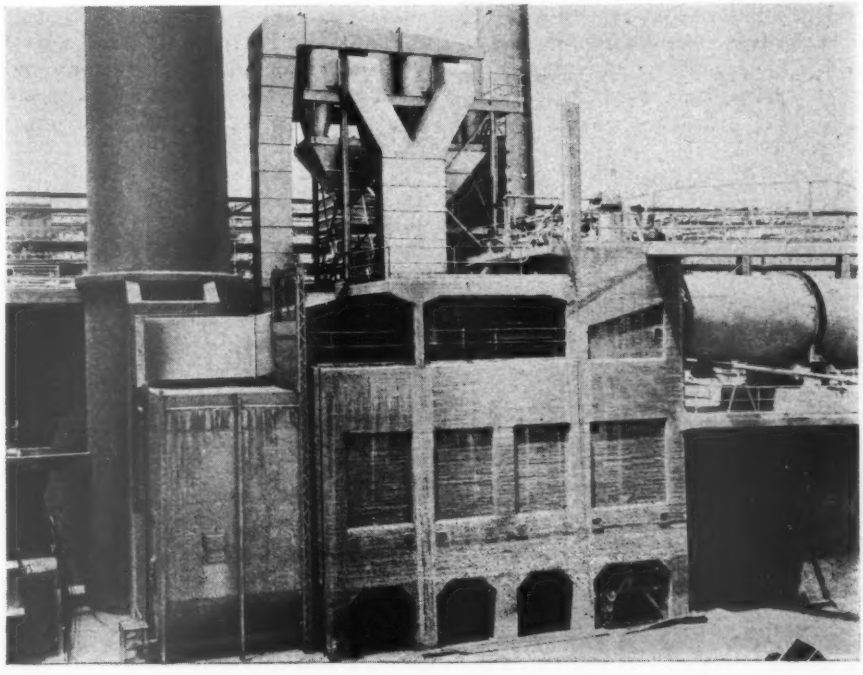
National The National Portland Cement Co., Brodhead, Pa., during the past year prepared and started a number of jobs to improve the operation of the quarry and plant but, due to the slow delivery of materials, only a few of these have been completed. Early in the year the rail transportation system was replaced by Koehring Dumptors with 6-cu. yd. bodies and General Motors diesel engines.

Complete plans have also been worked out for remodeling the secondary crushing plant. The present gyratory crusher is to be replaced by a Pennsylvania Impactor hammermill which will operate in closed circuit with vibrating screens. The capacity is expected to be 250 t.p.h. crushed to minus ½ in. Due to delays in the receipt of elevators, conveyors, etc., this work will probably not be completed until late in the summer.

Preparations for installing two F. L. Smidth cement coolers after the finishing mills are under way and will be completed soon. These coolers are designed to handle 125 bbl. per hour each and will cool the cement to 100-125 deg. F.

Santa Cruz The Santa Cruz Portland Cement Co., Santa Cruz, Calif., has plans under way for the installation of a third Lepol kiln. Six old rotary kilns are now being connected by a 200-ft. flue to a 200,000-c.f.m. Cottrell electrical precipitator which was purchased from the Cowell Portland Cement Co. The precipitator is connected to a 16- by 235-ft. stack. A Hardinge conical mill has been purchased which will replace some ball mills in the finish-grinding department. Changes are also being made to facilitate the loading of bulk cement trucks.

Missouri It is authoritatively stated that the Missouri Portland Cement Co. is planning extensive modernization of its Prospect Hill plant near St. Louis, Mo. From other sources it is learned that this program will also involve the



The stack dust collectors on one of the four kilns to be so equipped at the Victorville, Calif. plant of Southwestern Portland Cement Co.

Sugar Creek plant near Kansas City, Mo. The completed part of this program is said to include cement storage silos and shipping facilities at Memphis, Tenn. and river docks at Memphis and St. Louis. Cement will be received in barges from the St. Louis plant and packed in Memphis for distribution throughout the Mid-South.

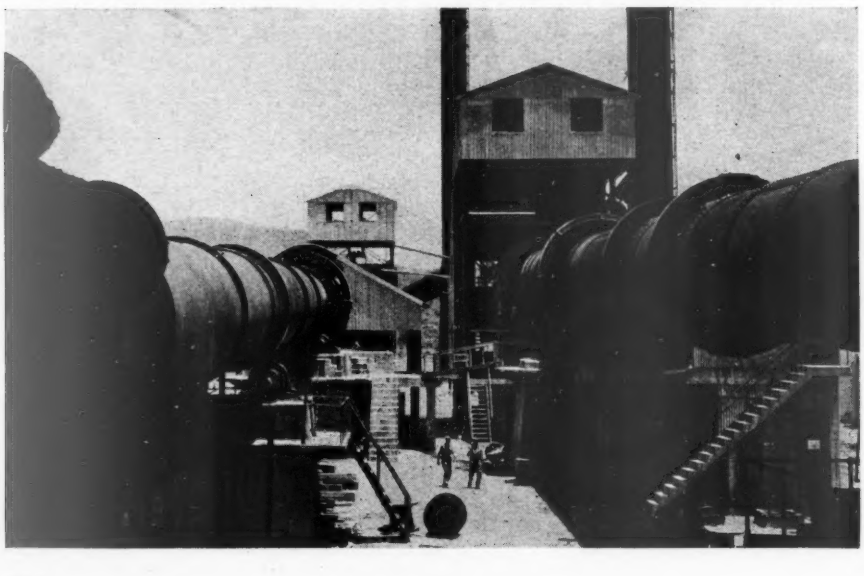
North American The North American Cement Corp. has well under way an important program at its three plants at Alsen and Howes Cave, N. Y., and Security, Md. The Howes Cave plant will soon be in full production for the first time since 1942. The burner building was rebuilt and three Raymond direct-firing bowl mills were installed.

Giant The Giant Portland Cement Co., Egypt, Pa., modernized its plant during the year by converting the stone dryer to use kiln waste heat, increasing the clinker grinding capacity, modernizing the stockhouse, etc. Quarry production was also stepped up by the replacement of two old steam shovels by a new Northwest 2½-cu. yd. diesel shovel, and the steam locomotives and cars by Euclid 15-ton end-dump diesel trucks.

Lone Star The Lone Star Cement Corp. installed a Western Precipitation Corp. Cottrell precipitator on the large kiln and Multiclones on the two small kilns at New Orleans, La.

Installations of cement storage silos and pack-houses of new design are being made at the Birmingham, Ala., Dallas, Texas, and Limedale, Ind., plants.

The two existing kilns of the Ponce Cement Corp., Ponce, Puerto Rico.



Volunteer According to reports the Volunteer Portland Cement Co., Knoxville, Tenn., managed to bring its plant through the war period in reasonably good condition and with very little deferred maintenance. The old rotary coolers were, however, replaced with Fuller grate clinker coolers about the middle of 1946. The end of the war brought a resumption of production of high-early strength and masonry cements and this, with some increase in clinker production, reduced the finish-grinding margin and another compartment mill is to be installed to restore the balance. This will be completed early in 1947. Also nearly completed is the installation of a separate packer, complete with supply system, for masonry cement in order to eliminate any possibility of contamination.

West Penn The West Penn Cement Co., Butler, Pa., is one of the many producers who had to go through the war period without even proper maintenance due to the many restrictions and shortages. Now, however, a number of improvements are under way and others are planned. An additional electric shovel is on order, preparations are being made for a new mill for the fine grinding of masonry cement, new belt-loading equipment has been installed on four packing machines, and a new compressor has been installed.

Peerless The Peerless Cement Corp., Detroit, Mich., has plans for improving its operations when conditions make this possible. At present some improvements are being made at the Detroit plant. The Port Huron plant, which produced chemical lime during the war years, was reconverted to cement production early in 1946. No other outstanding changes were made.

Pittsburgh Coke The Green Bag Cement Div. of the Pittsburgh Coke & Chemical Co., Neville Island, Pa., early in 1946 installed Fuller grate coolers on its two kilns with very satisfactory results. The packing house equipment is now being completely revamped and six 3-valve packers on the second floor are being replaced with six Modern valve packers on the first or car-loading floor. Two of the older machines will be installed in a building on the river bank for loading bagged cement to barges for river shipment. A separate bulk-loading station has been completed for loading cars on two tracks.

It is planned to install additional clinker-grinding equipment in the latter part of 1947.

Nazareth The Nazareth Cement Co., Nazareth, Pa., in August completed the installation of new Fuller cement coolers and has under construction a new packhouse with three packing stations. This is expected to be in operation early in 1947.

Kosmos The Kosmos Portland Cement Co., Kosmosdale, Ky., which had before the war carried out an extensive program of plant improvement, has since the war replaced four old waste-heat boilers with four new ones. A boiler feed water heating and softening plant and a new main steam line have also been installed. Many other improvements are now under way or planned.

Monolith The Monolith Portland Cement Co. is reported to be installing new kilns at its plant at Monolith, Calif.

Manitowoc The Manitowoc Portland Cement Co. has installed Cottrell precipitators on each of its three kilns.

California The California Portland Cement Co., Colton, Calif., is reported to be planning a new plant at Phoenix, Ariz.

San Antonio The San Antonio Portland Cement Co., San Antonio, Texas, is adding a 3600-hp. Nordberg diesel engine to its generating plant, already the largest of its kind in the industry.

(*Continued on page* 125)

CANADIAN CEMENT INDUSTRY HAS MANY EXPANSIONS UNDER WAY AND PLANNED

New Plant Planned For British Columbia

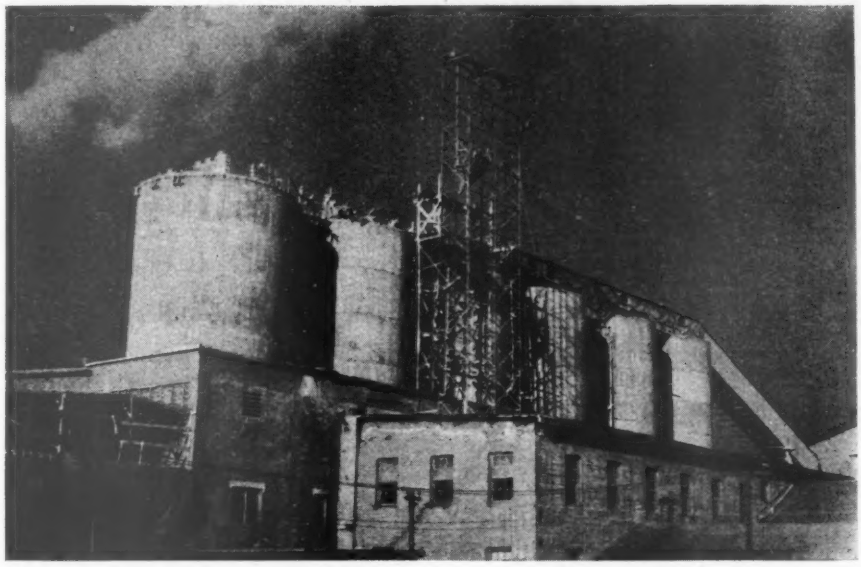
THE Canada Cement Co. dominates the industry in all of Canada except British Columbia and as it goes so goes the industry. The six Canada plants and the two operated by the British Columbia Cement Co. and the St. Mary's Cement Co. operate a total of 19 kilns with a total rated capacity of 33,250 bbl. daily. Figures for 1946 are as yet incomplete but it seems certain that shipments exceeded the 1945 figures of 8,471,679 bbl. which were in turn 18 percent over 1944. Official figures show that production for the seven months through July, 1946 totaled 5,908,875 bbl., compared to 3,668,268 bbl. in the same period of 1945, an increase of 61 percent. If this condition continued for the balance of the year 1946 shipments would total about 13,600,000 bbl., an all-time peak. The 1930 volume was 11,032,538 bbl.

CANADA CEMENT CO.

During the year 1946 the Canada Cement Company has undertaken several comparatively large construction projects that were designed to improve plant operation and increase capacity. This is a continuation of a sweeping improvement program which began before the war.

MONTREAL PLANT

At the Montreal plant a complete new coal-handling and grinding department is being installed to provide pulverized fuel for six kilns. One new kiln, two raw-grinding mills and a new conveying system to transport clinker from all kilns to storage and clinker grinding department are also being installed.



The new coal storage silos at Canada Cement Company's Montreal plant.

Coal Handling and Grinding The coal installation consists of a new track hopper, inclined bridge and belt, six new storage silos and six new coal pulverizers. Coal will be transported from the company's own dock, about one mile away, by either railroad cars and new diesel-electric locomotives, or motor trucks, and discharged into a large new track hopper at the plant.

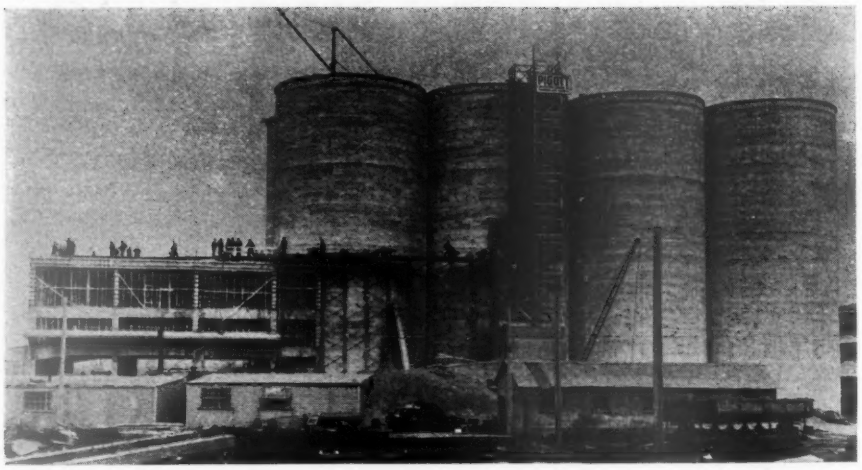
A feature of this hopper is its all-concrete construction, with steep sloping sides and vertical ends, so that there are no flat corner angles to hold up the coal. A 4-ft.-wide apron feeder discharges the coal from this hopper onto a belt conveyor leading to the top of the silos. A car-unloading enclosure is built over the track hopper with 12-in. concrete block walls and concrete roof. This part of the installation is designed to have high capacity, so that each day's requirements of coal can be unloaded in several hours.

The coal belt is 36 in. wide and is operated at 400 f.p.m. by a motor and reducer drive. The coal is scraped off the belt into each silo by special housed-in sweeps or scrapers set at such an angle to the line of belt travel as to give an easy flow. The monitor housing the belt and drive is made with concrete blocks and slab roof.

There are six circular reinforced concrete coal-storage silos each 25 ft. in diameter with 30-ft. vertical walls, and concrete cone bottoms having an included angle of 60 deg. All silos are supported on a reinforced-concrete column and girder structure, with outside curtain walls of 8-in. concrete blocks. The height of this structure from ground to point of support at the bottom of circular silo walls is 40 ft. Plywood was used in the forms for the inside surface of the cones so that a smooth finish was secured. The vertical walls are 8 in. thick and the cones run from 8 in. thickness at top to 6 in. at bottom. There is a flat slab roof over each silo fitted with access hatches and vent openings. An emergency valve is fitted near the bottom of each cone to empty the silo, with a portable chute in case a kiln has to be shut down for any length of time with its silo left full of coal. The discharge opening in the bottom of each cone

Left: Cooler on kiln at Montreal plant. A similar installation is being made at Exshaw.

Right: Coal pulverizer at Montreal plant with feeder and cone-bottom bin above.



Cement storage silos and packhouse near completion at Belleville plant.

is 24 in. in diameter.

Each silo will hold about 350 tons of coal, which is ample to carry over the week-end or several holidays.

An all-structural-steel feeder is bolted to the bottom of each concrete cone and can be cut off from the silo by a large slide gate. Each feeder is fitted with a small reducer and d.c., variable-speed motor drive. Coal is fed by a rod and small scraper reciprocating on top of a horizontal plate located underneath the opening at cone bottom. Coal discharges at both ends of this plate. The hot air connection for the air-swept mill is on the side of feeder so that the entire feeder housing will be kept hot to prevent wet coal from building up on the sides.

There are five new and one existing coal pulverizers, all of the tube-mill type. The feed ends of all units are located directly under the coal feeders on a concrete floor in the new structure about 10 ft. above the ground. The mills are placed parallel to the kilns with the discharge ends nearest the kilns. Each mill is 5½ ft. inside diameter and 25 ft. 5 in. center to center of main bearings. There are three compartments in each mill shell. First, there is a drying chamber 5 ft. long fitted with ¼-in. plate lifters for cascading the coal; then a special partition plate with scoop lifters for discharging the coal into the first grinding compartment. This compartment is about 6 ft. 3 in. long and loaded with 2.75 tons of 1½-in. balls. Then there is a slotted-section cast steel diaphragm with a large opening in the center for passing air. The second grinding compartment is 10 ft. 10 in. long and loaded with 5.25 tons of 1¼-in. balls. The two grinding chambers are lined with hard iron bricks about 2 in. thick and have corrugated faces. These bricks have radial edges and are grouted in with portland cement mortar. The main journal bearings are of large diameter to provide ample area for the passage of air and to accommodate cast iron internal flight liners. These journals are supported in removable babbitt-lined water-cooled bearings, lubricated by one large bronze oil ring in each housing. The housings are fitted with felt rings and special oil scrapers to make them dust- and oil-tight. Each mill is driven by a 125-hp. motor through a spur gear reducer, cut-tooth cast iron ring gear and tool steel cut-tooth pinion having spur teeth with 3½-in. pitch. The ring gear and pinion are housed in a dust- and oil-tight casing. Special circular flanges are provided on the ring gear to give a wearing surface for felt packing rings. The mills operate at 26.7 r.p.m. and, when supplied with air having a temperature of at least 500 deg. F., are expected to handle coal with a moisture content of 10 percent or more and give an output of at least 5 tons per hour with a fineness of 92 percent passing 100 mesh.

Each mill is fitted with a structural steel fan of the flat radial-blade type, directly driven through a pin-type coupling by a 50-hp. 1200-r.p.m. induction motor. The fan shaft is 3 15/16-in. in diameter and is carried in two heavy-duty S.K.F. spherical roller bearings mounted on a heavy structural steel bed-plate. The fan wheel is mounted on the end of the shaft with a tapered fit and a nut with a special locking washer. The fan casing is fitted with a circular door mounted on hinges for quick removal of rotor. Hot air is supplied to each mill by a large diameter 10-gauge insulated pipe leading from the kiln hood to side of feeder. This air pipe is installed so that it will be self-cleaning of any dust that is carried over. The mills are under vacuum and should therefore be clean. The coal piping is made from ¼-in. plate. As the coal fan runs at constant speed, all regulation will be accomplished by centrally-controlled dampers. First, there is a valve located near the kiln hood in the hot air pipe for admitting cold air for blending to suit the moisture content of the coal. Second, there is a butterfly valve in the hot air pipe to control the total amount of air going to the mill, and third, there is a cross connection fitted with a valve between the hot air pipe and fan inlet to raise the temperature in the coal pipe if required. The hot air pipes from all

Closeup of Belleville packhouse showing the cantilever canopies.

kiln hoods are also interconnected by suitable ducts and valves so that the pulverizer of any kiln that is being started up from cold may receive hot air from the adjoining kiln.

New Kiln and Coolers One new 11-ft. 5-in. by 10-ft. 2-in. by 11-ft. 5-in. by 430-ft. F. L. Smidth kiln is being installed. This unit will have a capacity of about 3200 barrels per day. It is supported on six tires. Five of them are of the floating type, and have solid rectangular cross-sections and one—the thrust tire—has a hollow box section and is riveted to kiln shell. All joints in the kiln shell are welded. The tires are mounted on heavy steel supporting blocks, welded to the kiln shell and machined to a true circle, and correct diameter to suit the tires. The shell plating at the tire locations is about 2¼ in. thick.

There are two support rollers under each tire. These are fitted with heavy journals carried in oil-lubricated self-aligning bronzed-lined bearings. The width of tire faces, size of support rollers, diameter and length of journal bearings, were all designed to give very conservative bearing pressures.

A very heavy type thrust roller assembly is provided. These rollers are fitted with anti-friction bearings and the lower one is capable of carrying the entire down-hill thrust of the kiln.

The main drive gear is mounted on spring plates to provide for shell expansion. The kiln is driven by a 150-hp. d.c. motor through a standard reducer and special gear box housing the slow-speed pinion. The normal operating speed will be about 1 r.p.m. of kiln shell.

There is about 95 ft. of chain section at the feed end. A steel shell brick-lined rear housing is provided, also louvers and conventional draft fan. There is a reinforced concrete brick-lined stack 15 ft. 6 in. in diameter inside lining at base and 200 ft. 10 in. high. The brick lining is laid tight against the concrete with three vertical expansion joints about ½ in. wide spaced 120 degrees apart. These joints are filled with asbestos.

A very complete F. L. Smidth centralized kiln control panel is provided.

Slurry is fed to the kiln by a ferris-wheel type of feeder which is kept in synchronism with the kiln speed. The ferris-wheel buckets discharge into a trough or pan inside the housing. The axial position of this trough relative to the buckets can be altered to change the rate of feed. No variable-speed drive is therefore required. A feed measuring tank is also incorporated inside the housing.

The primary clinker cooler is of the stationary air-grate type. The grate is about 6 ft. wide by 35 ft. long. The bed of clinker is moved over this grate by heavy cast-steel drag bars coupled together with special links to form a continuous chain. A special hydraulic drive is used to operate the drag bars. The air-grate is designed so that no clinker enters the wind box or plenum chamber. Air for cooling is provided by a heavy-type fan fitted with special louver control vanes on the inlet. All combustion air required by the kiln is taken from the cooler and will be highly pre-heated. Any excess air not required by the kiln will be carried off through a vent stack.

A new kiln building will be erected over the new kiln. It will have standard steel columns and trusses. The walls will be built with concrete block 12 in. thick at bottom half and 8 in. thick at top half. The roof will consist of channel section precast concrete roof slabs 1½ in. thick laid on steel I-beam purlins. The slabs will be covered with a felt pitch and gravel roof. Ample ventilation is provided for summer operation.

Clinker will be conveyed from all kilns to storage or clinker grinding department by a new 30-in. belt conveying system. Short drag conveyors are also required to convey the clinker from kilns to this new belt.

It is not expected that the clinker from five of the old kilns will be cool enough to handle on a rubber-faced belt without further cooling. Each of these kilns will therefore be equipped with a cooler conveyor. This conveyor is of the drag chain type with conventional sprocket drive. A special grate is provided similar to that used in the primary cooler and air will be blown through the clinker bed as it is conveyed.

Raw Mill To increase the grinding capacity of this department, two new F. L. Smidth Unidan mills are being installed, each driven by a 1000-hp. synchronous motor through a Symetro drive. The mill shell is 8 ft. in diameter by 42 ft. 8 in. long, and is fitted with three compartments. One end of mill is carried on a conventional ring-oiled journal bearing and the other is fitted with a special F. L. Smidth tire and slide-shoe bearing. Each of these mills will be loaded with 76 tons of grinding charge.

BELLEVILLE PLANT

At the Belleville, Ont. plant a new cement storage and packing plant is being built. This installation consists of 8 reinforced concrete silos 50 feet in diameter by 115 ft. high and a reinforced concrete 4-story packing plant. The eight silos with three inter-bins have a capacity of about 435,000 Canadian barrels. The silo walls are 12 in. thick and were built with moving forms. The load-carrying floors are supported on cross walls. Cement is withdrawn by six lines of 18-in. diameter screw conveyors, three under each line of silos. There are 24 withdrawal chutes in the floor of each silo. These chutes are fitted with all-structural steel under-cut valves. The conveyors are fitted with reversible drives so that cement may be conveyed to the packing plant at one end or to a boat-loading belt at the other end. Cement may also be conveyed by these screws from two older storages to the new packing plant.

Cement will be conveyed from the clinker-grinding department to these new silos by a new installation of Fuller pumping equipment. There is one filling pipe connection in the center of each silo roof. A combination ventilation, emergency overflow and access hatch is located in the roof close to each filling pipe. No monitors are provided on the roof, but instead light cable guard rails are used, supported on pipe posts with cast concrete block footings resting on top of the finished roof.

The packing plant is equipped with four Bates 4-tube 111-ft. packers, each fitted with transfer belt and shuttle conveyor for loading motor trucks. Each conveyor can be extended 25 feet outside the building so that long trailer trucks can be loaded. The belts are also reversible for loading railroad cars by hand trucks when on the "in" position. Two cars can be loaded at one time on each side of the packing plant. When the two center shuttle conveyors are drawn in, they connect with two short cross belts leading to the car-loading doors, so that there is only a very short trucking distance at all loading stations.

Provision is also made by overhead screw conveyors for loading bulk railroad cars and bulk motor trucks.

The elevating and conveying system is arranged to give complete flexibility so that cement from any silo may be packed in any machine and two different types of cement can be packed at one time. All cement is passed over Dillon vibrating

screens before packing. All conveyor troughs are built of concrete and the elevator casings are built with 6-in. concrete blocks.

The storage bins over the packing machines are reinforced concrete, rectangular in cross-section and hung from overhead concrete floor girders. The lower hopper sections have very steep sides, and the interior is made smooth by facing the forms with plywood or tin. All corners are well filleted. The cement flows very freely from these bins and does not hang up.

Two Sly dust collectors are located on the top floor and very large floor area is provided for storing about 2,000,000 bags. Special concrete magazine chutes are installed for feeding bags to the operating platform. A bundle of bags can be withdrawn from a chute, breast-high, by stepping on a foot pedal.

A reinforced concrete canopy having a cantilever of 25 ft. extends over the motor truck loading positions.

It is company policy to use concrete wherever possible in new construction. Practically the only structural steel or plate used in this installation is in the silo roof trusses, chutes and valves, shuttle conveyor frames and conveyor covers.

EXSHAW, ALBERTA, PLANT

The capacity of the Exshaw, Alberta plant is being doubled by installing a second kiln 10 ft. 2 in. in diameter by 300 ft. long. This in an F. L. Smidth kiln fitted with Unax coolers and is similar in design to the new kiln at the Montreal plant. The raw mill is being enlarged by two additional stone storages and two F. L. Smidth Unidan mills.

Various other improvements are contemplated at this plant, such as the building of a new packing plant, the introduction of truck haulage in quarry, etc.

OTHER PROJECTS

A number of other projects have been completed during the year 1946, such as the building of two concrete kiln stacks at the Winnipeg, Man. plant, one new installation at the Port Colborne, Ont. plant for loading bulk cement on the ship; and a number of all-concrete houses, offices and laboratories have also been built.

Designs are also being prepared for a new self-unloading bulk cement-carrying vessel to supply the outlying packing plants. This ship will be very modern in every respect and will be fitted with diesel-electric drive.

All field construction work is being carried out by the Pigot Construction Co. of Hamilton, Ont., the Angus Robertson Co. of Montreal, the Dominion Bridge Co. of Montreal, and the Commonwealth Construction Co. of Winnipeg, Manitoba.

With the exception of the F. L. Smidth & Co. kilns, Symetro drives and raw-grinding mills, all engineering and design work was done by the company's engineering staff, and all equipment except the Symetro drives is being made in Canada.

BRITISH COLUMBIA CEMENT CO.

Established in 1907, The British Columbia Cement Co., Ltd., Victoria, B. C., owns and operates the Bamberton cement plant, located at tidewater on the Saanich Inlet, Vancouver Island. The plant capacity is 1,000,000 barrels, or more, of cement per annum, which is marketed through various agency appointments throughout the province of British Columbia and elsewhere.

The plant is equipped with three rotary kilns, and in recent years an extensive organization program has been started, which will be completed in the next year or two. Raw materials are supplied through the Bamberton quarry, and from limestone and clay holdings located at the north end of Texada Island and Tod Inlet, Vancouver Island, respectively.

The company maintains a village for the benefit of employees, together with a school, recreation hall and single men's bunkhouse. Deep-sea shipping facilities are available from the company's dock, and of recent years, the company has played a major role in providing enormous quantities of cement to defense projects throughout the Pacific Northwest.

The company's product has been marketed under the trademark "Elk Brand" extensively for over 30 years. Certain specialized cements are manufactured and marketed under the trade names "Monocrete" and "Ferrocrete".

Cement market requirements within the province of B. C. have of recent years been substantial, and with added plant capacity in line with the company's present policy, it is expected export shipments of cement will be made within coming years.

Shortages of coal, power, labor and materials have curtailed company production sharply during the past few years, though a decided improvement has been noted in this regard since the cessation of hostilities.

A complete chemical laboratory for company research is maintained

(*Continued on page* 130)

The British Columbia Cement Co. plant on Vancouver Island which is being improved.

Cement Industry in Latin America Continues to Expand Its Capacity

CONDITIONS in the cement industry in Latin America (Mexico, Central and South America) and the Caribbean, in general reflect world conditions. In most of the many countries involved cement production dropped off considerably during World War II due mainly to lack of fuel, equipment and supplies. This, plus the complete cessation of imports, put an effective brake on the building and construction booms which had started in most of these countries before the war.

Now conditions are gradually improving, with existing plants going back into capacity production due to the increasing availability of fuel and supplies, and with the completion of some of the many new plant and expansion programs under way. Imports are also increasing but indications are that most of these countries will be able to supply most of their own needs within a few years at the rate their domestic cement industry is expanding.

Mexico

In the past year conditions in the cement industry in Mexico have improved considerably. There has been no slowing down of the building boom; in fact, the Aleman government, just gone into power, has indicated that no effort will be spared in intensifying the program of industrialization, agricultural development and modernization begun during the Camacho regime. Whatever delay there has been in the construction program has been due to the shortage of cement, which in turn has been largely due to the shortage of oil, rail transportation and equipment. This condition had been largely alleviated and the construction of new plants and the expansion of others has also helped. Duty-free imports of foreign cement with special freight-rate cuts for this cement have helped considerably. Additional new plant and expansion programs now under way may make Mexico nearly self-sufficient in the production of cement.

As a result the Government is said to have agreed to relinquish the control it has exercised over cement distribution and prices. Existing plants now sell their output to dealers at 105 pesos per metric ton f.o.b. plant. Plants not yet in production will be permitted to charge 115 pesos per ton. Dealers are allowed to charge freight haul plus 10 percent of the sale price to the consumer. Some producers feel that the removal of price controls will solve all existing problems.

In 1945 cement consumption in Mexico was 917,276 metric tons, of which 108,958 tons was imported. The capacity of the industry is now said to be 1,000,000 tons but output apparently did not reach that figure. With the completion of the projects now under way it is felt that production in 1947 might reach 1,500,000 metric tons if all other conditions are favorable.

Blanco Cemento Portland Blanco de Mexico, S.A., Mexico, D.F., now has in operation its white cement plant at Tlalnepantla, just north of Mexico City. This is producing 20 metric tons daily. It has under construction at Vito, State of Hidalgo, a second white cement plant of 70-ton capacity which is expected to be in operation about the middle of 1947. This plant will have an aerial tramway, a 7- by 130-foot Vulcan kiln, and a 3- by 12-ft. Fuller clinker cooler. Most of the equipment was purchased in the United States.

When the Vito plant is finished the Tlalnepantla plant will be enlarged and modernized with a capacity increase of nearly 300 percent.

Nacional The plant of Cementos Portland Nacional, S.A., at Hermosillo, Sonora, is rapidly being re-erected at a new location. This one-kiln, 120-ton wet-process plant was originally built in 1931 but recently proved to be in the basin of a new power and irrigation dam. It was operated until the last possible moment and then moved to the new location, where the necessary foundations and other concrete work had already been prepared by the Macdonald Engineering Company, also the builders of the original plant.

In rebuilding, the plant's capacity was increased to 250 tons daily by extending the original 150-ft. kiln to 330 ft. Two new Traylor mills, a Fuller grate cooler and Fuller-Kinyon pumps were added. Two new Worthington 1080-hp. supercharged diesel engines are being in-

The plant of Cementos Portland Nacional, S. A., at Hermosillo, Sonora, being rebuilt at a new site.

stalled to supplement the three original 360-hp. units.

Del Pacifico Another of the new 1946 plants is that of Cementos del Pacifico, S.A., at Mazatlan, Sinaloa, Mexico, which was completed in April. This one-kiln operation has a capacity of 150 metric tons of portland, pozzuolan and mortar cements. Provisions have been made for the installation of a second kiln to double the capacity. Limestone is obtained from a quarry 2½ mi. from the plant but the plant will operate at least for the first year on a pile of minus-3-in. stone which has accumulated from 17 years of operation of a lime shaft kiln on the property. A Traylor crusher is being installed at the quarry and the stone will be hauled by two Plymouth and two Fordson locomotives and 60 dump cars to the 5000-ton plant storage. The clay is hauled in dump trucks from a nearby deposit to a 3000-ton plant storage. An overhead crane serves the storage, which also contains clinker and gypsum.

A Kennedy-Van Saun gearless gyratory crusher is used to reduce the stone to ¼-in. size and the clay is reduced by a dry pan. A single drier is used alternately for the limestone and the clay. In the raw grinding department there are four 500-ton bins, two No. 66 Kominuters and a tube mill. Four 900-ton silos are used for blending the raw materials, which are then fed to the 250-ton kiln-feed bin. The kiln is 8- by 150-ft. and has a 6- by 50-ft. cooler.

There is storage for 6,000 tons of clinker and 600 tons of gypsum and these materials are fed by the crane to hoppers feeding the mills. There are two No. 66 Kominuters and two 5½- by 50-ft. tube mills. The finished cement is stored in six silos with a combined capacity of 36,000 bbl. and the cement is bagged by a Bates packer.

Del Bajio The plant of Cementos Portland del Bajio S.A. at Leon, Guanajuato, Mexico, is now completed and is to begin production during the first two months of 1947. This plant, which was more completely described in the July, 1945, issue of PIT AND QUARRY, while under construction, is a dry-process operation and will produce only portland cement for the time being with a capacity of 450 metric tons daily. It has three kilns: two 10- by 150-ft. and one 9- by 145-ft. It will serve a densely-populated area in Central Mexico including the states of Guanajuato, San Luis Potosi, Queretaro, Aguascalientes and part of the States of Michoacan and Jalisco, with a population of more than 4,000,000.

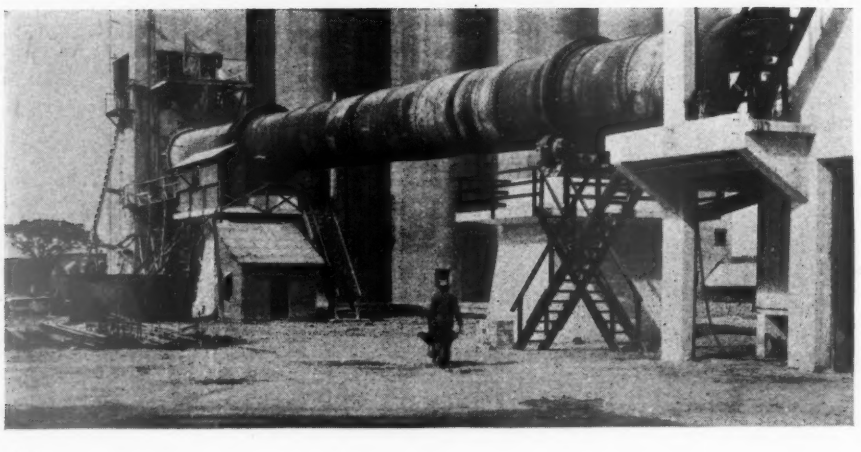
Chihuahua A new cement plant is under construction at Chihuahua, Mexico, by Cementos de Chihuahua S. A. which is affiliated with the Marquette Cement Manufacturing Co., Chicago. This dry process plant will have a capacity of 800 bbl. daily and is expected to be in operation early in 1947. Stone will be quarried from a 600-ft. hill and transported 1.5 km. to the plant by dump trucks. At the quarry the blasted stone will be slushed by a 3-drum Sullivan electric scraper hoist into a bin from which trucks will be loaded through a pneumatic gate which the truck driver can operate without leaving his cab. The clay pit near the plant and a similar method of excavating and loading will be used. The drier and the 8- by 200-ft. kiln will be oil fired. The normal marketing area of this plant will be in the States of Chihuahua and Durango. The existing backlog of orders is already said to nearly equal the first year's production.

La Tolteca La Tolteca, Compania de Cemento Portland S. A., which with its affiliated Mixcoac operation, is the largest producer of portland cement in Mexico, has announced plans for the construction of a completely new plant at Tolteca, Hidalgo, north of Mexico City. The new facilities will be located adjacent to the present plant and will have a capacity of about 750 metric tons daily. Most of the equipment for this plant has been ordered in the United States and Great Britain.

Complete mechanization of the limestone quarry will be accomplished with two Bucyrus-Erie 6-inch well drills and one 2½-cu. yd. Bucyrus-Erie electric shovel. The 36-in.-minus limestone will be carried to the primary crusher, about 150 yards from the quarry, in 15-ton side-dump trucks. The primary crusher is an Allis-Chalmers 42-in. Superior McCully gyratory type, which will reduce the stone to 6 inches. This material will then be taken by belt conveyor to two 4½-ft. Symons cone crushers, which will crush it to 1½ inches. Another belt conveyor will carry it to a hopper. From this point 15-ton side-dump trucks, identical with those mentioned above, will transport the stone to the plant, about three miles distant.

Further crushing by two 4-ft. Symons short-head cone crushers will result in ½-in. material, taken by a belt conveyor to the mill hopper or to the tube mill.

The clay will be washed by a 16-ft.-diameter wash mill in the clay quarry and pumped by Newell slurry



The new kiln, and a general plant view of Cementos del Pacifico, S. A., at Mazatlan, Sinaloa.

pumps to the clay mixing tank, from which it will be fed by gravity to the tube mill.

The stone is to be fed by 24-in. Merrick Weightometers to the two Newell 7¼- by 40-ft. compartment mills, which are driven by 800-hp. Metropolitan Vickers synchronous motors. Slurry will be pumped to three tanks for correction, and will flow from there by gravity into two slurry mixers 66 feet in diameter. From the mixers it will be pumped to the kiln feeders. All pumps are of the piston type, made by Newell.

Two new Vickers-Armstrong kilns 350 feet long and 11 feet, 6 inches and 10 feet 2 inches in diameter, with enlarged calcining zones and chain systems at the feed end, will be installed.

The clinker will be discharged into two 6- by 29-ft. Fuller coolers and carried by belt conveyors to the mill hopper or the main storage. The latter is served by a 7½-ton overhead electric crane.

Two Newell finish mills, identical with the wet raw mills, will be used; they will also be powered by 800-hp. Metropolitan Vickers synchronous motors. A 24-in. inclined belt conveyor will carry the cement to the present cement silos; packing will be done by two Taylor four-tube bagging machines.

Mixcoac At the plant of the affiliated Cemento de Mixcoac, S. A., at San Pedro de los Pinos, a suburb of Mexico City, the latest of a long series of improvements and additions was completed in 1946, making it the largest single producer in the country with a capacity of 750 metric tons (about 4400 bbl.) daily. The latest additions include Allis-Chalmers and Fuller grate coolers on two of the three kilns, Northern Blower Co., stack dust collectors on one kiln, and many other less important items. A new 700-hp., 3-compartment finish mill has also been ordered from the British firm of Ernest Newell & Co. for installation early in 1947. This mill will increase the output of both standard portland and masonry cements and will also make it possible to produce high-early-strength cement. Other improvements are planned as new equipment becomes available.

Veracruz Cementos Veracruz, S. A., whose 200-ton daily plant at Orizba, Veracruz, went into operation early in 1946, is working on a project to increase capacity by 50 percent.

Guadalajara Cementos Guadalajara S. A., at Jalisco, Guadalajara, is reported making additions which will double its present capacity of 200 tons daily.

Cruz Azul Another recent plant, that of Cooperativa Manufacturera de Cemento Portland, S.C.L., "La Cruz Azul," at Laguna, Oaxaca, is reported to be doubling its present capacity of 80 tons daily.

Del Norte Cementos del Norte S. A., at Monterrey, Nuevo Leon, has installed a slag dryer in its new plant which is now complete. This is a grinding and packing plant using slag and portland cement from nearby plants to produce a slag-portland cement. It has a capacity of 400 tons daily.

Miscellaneous An existing dry-process plant in Mexico is making a 240-metric ton addition to its plant. New equipment to be installed includes a 9- and 10½- and 9- by 270-ft. Allis-Chalmers kiln which will operate in conjunction with a grate-type cooler. This kiln will prepare standard portland cement which will be mixed with a natural pozzuolana found locally and ground in determined proportions to produce pozzuolanic cement and mortar, which are the two principal products of the company.

At the same time the grinding departments are being enlarged. A No. 830 Allis-Chalmers two-compartment Compeb mill with center discharge is being added to the raw grinding department. Two identical mills are being added to the finish-grinding department.

Cuba

Cuban Mining During the war the Nicaro Nickel Co., a subsidiary of the Freeport Sulphur Co., New York City, purchased the buildings and some of the equipment of an old U. S. plant. This was used in the construction of a nickel plant in Cuba. Negotiations are now under way which, if completed, will result in the conversion of a manganese concentrating plant to the production of portland cement in 1947. This operation would be undertaken by another subsidiary, the Cuban Mining Co.

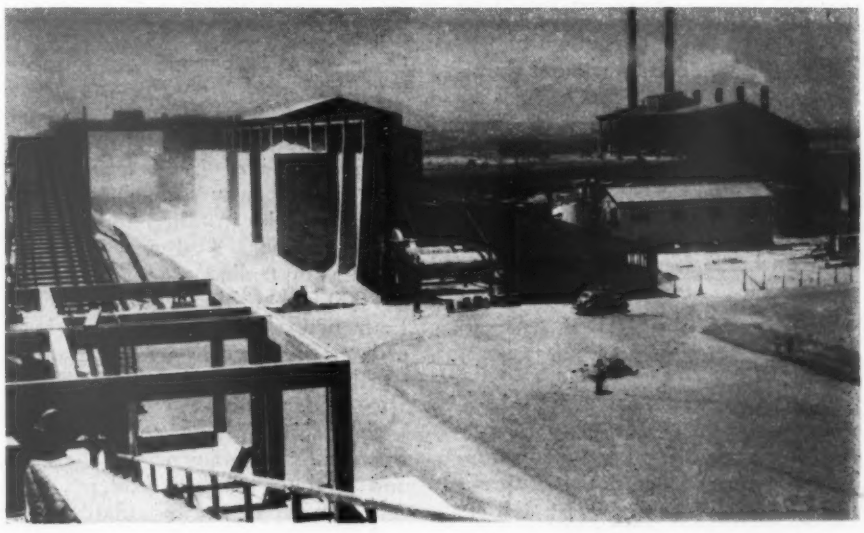
Cuban Portland The Cuban Portland Cement Co., a subsidiary of the Lone Star Cement Corp., New York City, is said to have installed a new kiln late in 1946.

Jamaica, B. W. I.

The proposed erection of a cement plant near Kingston, Jamaica, by a large British concern, partly with Jamaican capital, is reported to have been postponed indefinitely.

Argentina

In Argentina the backlog of construction piled up during the war will probably be supplemented by proposed government construction of airports, highways, etc. Argentina now has a plant capacity large enough to meet all ordinary domestic requirements for portland cement and has adequate resources and raw materials for any necessary expansion of production facilities. As a result it seems doubtful if the demands for portland cement will ever again offer more than a temporary market for imports. There is also in the country a strong tide of nationalization of industry, as well as a policy of governmental protection of local manufacturing. That trend may effect the manufacturing of cement through the organization of a combined Government-and-privately-owned company to manufacture cement to repair earthquake damage.



The new plant of Sociedad Cemento "Juan Soldado" at La Serena, Chile.

The pilot plant which supplied 75 bbl. of cement daily for the new 1500-bbl. plant of Cia. de Cimento Portland "Paraiso" at Sao Paulo, Brazil.

The present cement plants in Argentina are near the centers of population and market outlets and have adequate stocks of all raw materials except fuel in their immediate vicinity. Inland transportation remains one of the greatest difficulties, and it is believed that requirements of any large quantity inland will be met by construction and operation of neighborhood plants through government aid rather than by importations.

With fuel oil again in free supply the local production of white cement increased greatly in 1946, but it is doubtful if the industry can take care of the total demand. It is thought that as long as the deferred building programs progress there will be a good market for imported white cement.

The portland cement industry got its start in Argentina in 1908 when 7,000 metric tons was produced in one plant. By 1938 there were 11 plants with adequate capacity to meet all the needs of the country. The ouput that year was 1,160,706 metric tons, the largest in history except for a slight edge in 1941. No official data are available for production in 1944 and 1945, when there was a critical shortage of fuel oil. In spite of Government subsidies and the use of such fuels as linseed oil and wheat, it is doubtful if those years approached the one-million-ton goal.

Argentine Portland The Argentine Portland Cement Co., Buenos Aires, a subsidiary of the Lone Star Cement Corp., New York, is reported to be adding grinding equipment to its plant at Parana.

In 1943 a Government decree was issued prohibiting exportation of any portland cement and this is still in effect. During 1944 and 1945 no cement was imported due to wartime shipping difficulties but during 1946 considerable quantities were received.

Brazil

"Paraiso" The Compania de Cimento Portland "Paraiso" at Sao Paulo, Brazil, was formed in 1942 but due to the war erection was not started until 1946. The operation is about 400 km. from Rio de Janeiro and the raw material is obtained from a mountain of pure calcite. Up to now production has been only 75 bbl. daily from a small pilot plant which was built to supply the cement for the large plant. Mostly reconditioned used equipment is going into the main plant, which will be wet process and will have a capacity of about 1500 bbl. daily. Allis-Chalmers mills and two Vulcan rotary kilns are being installed.

Lime will also be produced in a rotary kiln, the first to be installed in Brazil. The erection of both plants is under the supervision of Oliver A. Dibble, well known in the United States through years of association with the Aetna Portland Cement Co.

Chile

"Juan Soldado" The new plant of Sociedad Cemento "Juan Soldado" at La Serena, Chile, went into operation in January, 1946, and is now producing an average of 3,500 bbl. of finished cement daily.

A number of improvements are now under way or planned. A feeder will be installed for the primary crusher, a 4-cu.-yd. shovel and Easton trailers are on order, and a 6,000-kw. turbine will be installed. Four new slurry mixers have been ordered and six cells are being added to the flotation plant. Plans are also under way to install Oliver United slurry filters in order to improve the fuel efficiency of the kilns and of the waste-heat boilers. The coal available at this plant costs, pulverized, about $20 per ton, contains 16 to 18 percent ash, and contains only 12,000 B.t.u. per pound.

Polpaico Construction of the new plant of Fabrica de Cemento de Polpaico in Chile is said to be well under way and plans for the Finguiririca (San Fernando) plant are far advanced.

Venezuela

Falcon The Cement Division of Erle P. Halliburton, Inc., which is building a plant in the United States as described elsewhere in this issue, has organized Cementos Falcon S. A. to build, own and operate a new plant at Chichirivichi, State of Falcon, Venezuela. J. Jack Benge of Caracas is vice-president in charge of this venture. All necessary surveys have been made and the property acquired. The raw materials have been tested and orders for equipment are being placed as rapidly as possible. Construction will begin within 90 days and the plant is expected to be in operation in November, 1947.

Such rapid progress is expected because of the purchase in July, 1946, of the U. S. Government-owned alumina plant at East St. Louis, Ill., which contains all of the necessary basic equipment for both plants.

This plant is located on the south shore of a bay which is completely weather-protected and is large and deep enough for ocean-going vessels. There are no railways or highways and all shipments will be made by water. Special self-unloading bulk cement cargo vessels are being purchased. Cement will be distributed through storage and packing plants at strategic locations within economical shipping distance of the plant.

The limestone to be used as a raw material is in the form of a 600-ft. cliff and analyzes 98.75 percent calcium carbonate. This cliff extends ten miles along the south shore of the bay and runs back from the shore at least 20 miles. A glory-hole mining operation will be used. The clay to be used is found in abundance ten miles from the plant. It will be excavated by a Sauerman drag scraper to a wash mill, from which it will be pumped to the plant. Gypsum is found within 20 miles of the plant and iron ore is also obtainable locally. Power will be provided by a Type T-2 tanker less than two years old which has been purchased from the U. S. Maritime Commission. This is a 10,000-hp. unit.

(*Continued on page* 133)

Conditions in the Cement Industry in Europe, Africa, Asia and Oceania

GENERALLY speaking, the cement industry in Europe has been handicapped more since the end of the war by the shortage of coal than by any other factor including war damage. This is true even in Germany where cement plants were not considered as important as bombing objectives as were other factories, and transportation. In Europe, and in Africa, Asia and Oceania, as in the rest of the world, there is a huge backlog of necessary construction work to be done and the cement industries in these countries have also accumulated large backlogs of demand for new equipment, new plants, supplies, etc.

On this map are shown the locations of all the portland cement plants in Spain and their approximate capacities.

Spain

The production of portland cement in Spain was seriously affected during the war and since by a shortage of coal, equipment and supplies. In 1944 sales totaled 1,521,323 metric tons as compared to 1,492,708 tons in 1943. No new plants were built in 1944. In 1945 the sales were 1,429,315 tons of portland cement. Many of the existing plants in Spain are now being improved and a substantial increase in capacity will also result.

Portland cement is produced in 31 plants in Spain and these are well distributed geographically as can be seen in the accompanying map. The annual capacity of the industry is now about 2,750,000 metric tons which is produced in 51 rotary and 25 vertical kilns. Of the rotary kilns 26 use the wet process. The largest plant has an annual capacity of 200,000 tons and the smallest 25,000 tons.

Industrially and financially the various cement companies in Spain are independent of each other but for matters of corporate representation and common services such as statistics, investigation, etc., they are all members of an association, the "Agrupocion de Fabricantes de Cemento," located at 26 Alfonso XII St., Madrid.

At present the production, distribution and price of the cement produced is controlled by the Government through an agency known as "Delegacion del Gobierno en la Industria del Cemento." This agency controls all production and 90

percent of the distribution of the cement produced by each plant, but even the free 10 percent must be sold at a fixed price which is fixed periodically. Since March, 1946, this price has been 183 pesetas per ton, f.o.b., the plant.

Asland The Compania General de Asfaltos y Portland "Asland" is the largest portland cement manufacturing enterprise in Spain. It was founded in 1901 and was the second firm to install a plant in the country. Since that date it has developed constantly and now operates five different plants strategically located all over the country.

The first plant erected was in 1902 at Pobla de Lillet in the Pyrenees Mountains very close to the French frontier. The machinery was furnished by Allis-Chalmers. Three 6- by 60-ft. rotary kilns were installed with all the necessary equipment for grinding and a pipe line three miles long and with a head of 1,000 ft. carries hydraulic power to the Pelton water wheels installed at the plant. The total power obtained under normal conditions is 2,400 hp. This plant was erected under supervision of American engineers. In 1909 the plant was enlarged and a new F. L. Smidth, Copenhagen, 8- by 130-ft. rotary kiln with an enlarged zone was installed. Two No. 50 Kominuters and two ball-tube mills were also installed. In 1911 a second enlargement was made and another 8- by 130-ft. kiln, this time Allis-Chalmers, was erected. By this time the first installation of waste-heat boilers was made with very satisfactory results, the Babcock and Wilcox standard boilers producing about 70 percent of the power required. The boilers were necessary during the winter on account of the scarcity of water due to freezing.

The three original short kilns were by that time dismounted and two of them used as coolers for the new kilns, whilst the third one was dedicated to burn white portland cement which was made for the first time in Spain in 1922. The actual capacity of this plant is now 80,000 tons a year.

The second mill built by Asland was the Moncada plant, located 8 miles from the most important commercial harbor of Spain, Barcelona. It was erected in 1916. Two Allis-Chalmers 9- by 140-ft. kilns, with ball mills and ball-tube mills, were installed. This machinery had been installed for the construction of the Tremp Dam which was constructed by a Canadian company, and was sold and transferred to Moncada when the construction was completed. In 1923 a third Allis-Chalmers 10- by 165-ft. rotary kiln was installed which made the capacity of the plant 165,000 tons a year.

From 1931 to 1936 political events caused a serious drop in construction and most of the plants were running at 50 percent of their capacity and under. It was at this time that a French engineer, Mr. Basset, induced the company to try out his patents for making pig iron and clinker simultaneously in rotary kilns.

Asland prepared one of the 9- by 140-ft. kilns at this plant for this purpose and after solving some important problems, succeeded in obtaining 60 to 80 tons daily of cast iron, and 80 to 60 tons of clinker. The "technique" of the process proved to be perfect but practice demonstrated that the machines had to be adapted to the very hard work of the new process. By the end of 1935 the plant was partially shut down and a big transformation carried out to adapt it to the Basset Process. Unfortunately this work was not finished until July, 1936, and just after the first trials, the Spanish civil war burst out.

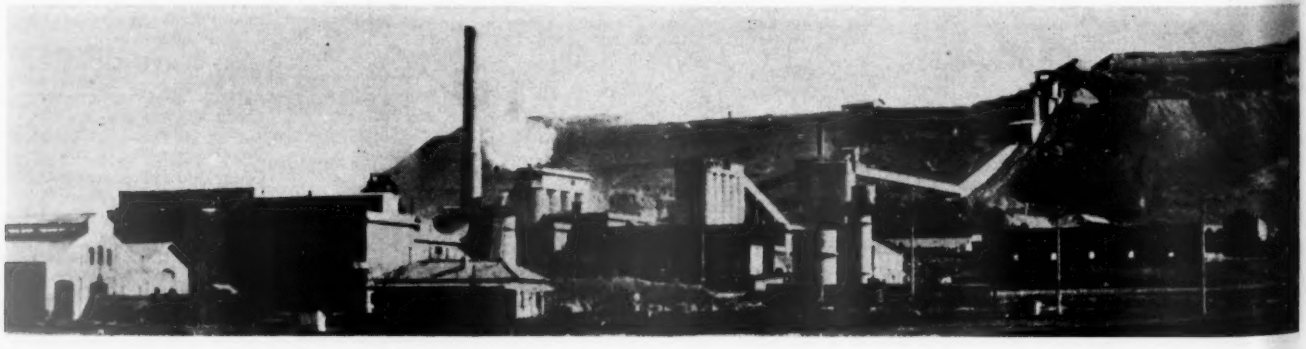
In 1939 when the war was over, conditions had changed completely, and the reconstruction of the country, which had suffered the widespread destruction of bridges, roads and entire villages, created an enormous demand for portland cement, which caused the company to convert the whole factory back to portland cement manufacture.

Scarcity of fuel, due to World War II, and the satisfactory results obtained in the Asland plant at Cordoba with the Lepol kiln, made the company consider the installation of a Lepol kiln in this plant and, it being impossible on account of the war to import one from Germany, a license was obtained to build the kiln in Spain. This was done in 1942 and in May, 1944, the new Lepol kiln was fired, increasing the capacity of the plant to 200,000 tons a year. One of the 9- by 140-ft. kilns was shut down and is being moved to a new temporary plant being built exclusively for supplying cement for the construction of a big dam and hydraulic works in the provinces of Lerida and Gerona.

The third plant belonging to and being operated by Asland is the Villaluenga plant. It was erected in 1925 and began to produce in February, 1936. This plant is 25 miles from Madrid and 10 miles from Toledo and is in the geographical center of Spain. The capacity was at first 90,000 tons a year but in 1929 another kiln was installed and the capacity increased to 180,000 tons yearly. There are two 10- by 165-ft. Allis-Chalmers rotary kilns with waste-heat boilers and two 1600-kw. turbo-generators of the same make.

Four Allis-Chalmers Compeb mills, two No. 726 and two No. 830, driven by synchronous motors, provide the raw material for the kiln and take care of the grinding of the clinker. The power house contains two Edge-Moor boilers and two 1,600-kw. Allis-Chalmers turbo-generators.

A railroad 10 miles long constructed by the company connects the plant with the main lines to the coal mines of Purtollano and Penarroya from which the fuel is received. It is said to be the most efficient plant in Spain on account of being independent of power supply which is scarce in the central zone of Spain, and also for its excel-



The No. 3 or Villaluenga (Spain) plant of Compania General de Asfaltos y Portland "Asland."

lent location and modern, efficient machinery.

In 1928 Asland acquired a portland cement company which owned a factory in Bilbao on the north coast. It has a capacity of 40,000 tons a year and is equipped with German machinery. Power is scarce in that zone, too, and Asland, in order to make it efficient, erected a power house with Edge-Moor boilers and an Allis-Chalmers 800-kw. turbo-generator. The location of this plant on the north coast and very close to the coal mining district is very valuable in business.

In 1929 the fifth of the Asland factories was built. This is located at Cordoba in the southern part of the country and very near the southern coal mines of Penarroya. This time German machinery was selected and a complete installation was made by Polysius. The kiln was of the grate-rotary Lepol type and was one of the first of this type installed in the world. It was inaugurated in 1931. The results obtained with this kiln have been very satisfactory, attaining a coal consumption under 16 percent on a dry coal basis when using 7,500-cal. fuel.

The capacity of this plant is 80,000 tons a year. Two compound mills, one for raw material and the other for the finishing department, driven by high-speed motors connected through speed reducers, are used. The electric equipment is from Brown Boveri. There are no bucket elevators (except at the crushing plant) nor conveyors, compressed air being used for this purpose by means of a complete installation of Cera pumps. Raw material, clinker, and coal are stored in a building 300 ft. long by 60 ft. wide in which a traveling crane moves the materials with a clamshell bucket. A high-pressure fan is used for the injection of coal into the kiln and coal of very low volatility can be used with good results. The temperature of the burning zone in this process must be at least 100 deg. C. higher than in normal rotary kilns on account of the nodulation.

Zaragoza The plant of Cementos Portland Zaragoza at Zaragoza is a medium-sized operation as Spanish cement plants go. It is located in the northeastern part of Spain, in Zaragoza, which is a city of 300,000 population, and has good connections with main highways and railroads. The plant was built in 1928 and has a capacity of 520 metric tons annually.

The raw materials are hauled by industrial railway from the quarries and mines to the plant. The wet process of manufacture is used and the burning is done in two 2.4- by 65-m. Smidth Unax kilns, each with a capacity of 260 tons daily. The equipment used for raw material grinding and preparation includes two 1.75- by 11-m. Smidth Unidan mills. The slurry is carried by pumps and elevators into five cylindrical tanks with a total capacity of 2,500 tons. They are equipped for air agitation.

The fuel, 100 percent lignite, is dried before it goes to two 1.4- by 14-m. grinding mills. High-pressure fans blow the pulverized fuel into the kilns. The clinker grinding equipment is similar to that used in the raw department. The cement is stored in buildings with a capacity of 6,000 tons and is packed by a Bates machine and a Smidth Exilor packer.

All the equipment is driven by individual electric motors, power coming from a local plant at 45,000 v. and being reduced at the plant by 800-kw. transformers.

This plant was designed and built by F. L. Smidth & Co., Copenhagen, which also supplied most of the equipment. Babcock & Wilcox boilers and Spanish General Electric electrical equipment are also used. In normal times there are 135 workers in the plant, 45 in the quarries and 80 in the mines.

Minera The Sociedad Financiera y Minera, Malaga, has a dry-process plant located near the ocean, 8 km. from the port of the former city and on the main highway from it to Almeria. It is also connected with Malaga by railroad.

The plant now has a capacity of 114,000 metric tons annually with its four Pfeiffer-Thiele automatic shaft kilns, but these are being replaced by a 75,000-ton capacity Lepol kiln now being installed. This kiln should have been in operation

The No. 2 or Moncado plant of "Asland" with quarry in background.

by now but material shortages have delayed its completion. It is now expected to go into operation about the middle of 1947.

The grinding department of this plant consists of two 2- by 11-m. Krupp-Centra mills and three Pfeiffer mills, one 2- by 3.5-m. and two 1.75- by 3.5-m. The last-mentioned two mills will be replaced by a modern one of capacity similar to the Krupp mill.

Two new 6-in. Fuller-Kinyon pumps are being installed for the transportation of raw material and cement. An extra 3-tube packer is being installed in the packing department.

Rezola Cementos Rezola, S. A., which operates a plant at San Sebastian, Spain, plans a number of changes in the preparation of the raw materials. This includes the substitution of compound mills for the present closed-circuit arrangement. It is also planned to install Fuller inclined-grate coolers on the Lepol kilns.

Sweden

Skanska According to the Skanska Cement, A. B., which controls nearly all of Sweden's portland cement output, a total of 743,000 tons of cement was produced at the company's works in 1945. This was 19 percent over 1944 and 7 percent over the 1939 all-time record.

An expansion program in progress at the Skanska plant at Koping in central Sweden will increase the company's capacity by 160,000 tons annually. The company also plans to build a new 320,000-ton plant near Stockholm which should be completed late in 1947.

Belgium

In Belgium the shortage of coal has not affected the output as seriously as in some other countries as most domestic needs are supplied by metallurgical cements, which require less coal for their production than portland cement. Some of these cements have been found highly satisfactory for local use, but, owing to costs of transportation, expansion of exports depends upon production of high-grade portland cement. It is considered that the industry is otherwise ready to at least double its production and to place the increase in foreign markets as soon as a more liberal allocation of coal is possible. The production of cement in the first half of 1946 totaled about 700,000 tons, about half the production for the first half of 1938.

D'Obourg The plant of S. A. Ciments D'Obourg is located at Obourg in the Province of Hainaut, Belgium, near coal fields and quarries and on a canal, railroad and highway, giving easy access to the port of Antwerp. This wet-process plant had a capacity of 456,000 tons of cement annually before the war. During the four years of German occupation only essential maintenance work was

Left: The new building for the depot kiln being installed in the plant of Sociedad Financiera y Minera at Malago, Spain.

Below: The plant of Cementos Rezola, S. A., at San Sebastian, Spain.

done but as soon as the war was over a program of modernization, conversion and expansion was begun which will make this plant one of the largest in Europe. This program, which is now near completion, will increase the output of clinker to 700,000 tons annually or about 4,200,000 bbl. The milling capacity has been increased to about 1,200,000 tons annually or about 7,200,000 bbl. This milling will be done in two stages with air separation so that the cement would pass the A.S.T.M. specification in the U. S. The loading capacity of the plant has been brought up to that of the mill for rail and water shipments or a combination of both.

Poland

Poland has found that cement exports can provide more foreign exchange than any other product except coal, so export agreements totaling more than $5,500,000 have already been signed. The Central Administration of Building Material Industry planned an output of 1,300,000 tons of cement in 1946, half to be exported and the other half to be used largely for rehabilitation in devastated areas of Poland. Shipments are being made to Brazil, West Africa, Malta, and Sweden by boat. Overland shipments are also being made to Hungary, Rumania, Switzerland and Russia, the latter having an agreement for 400,000 tons.

Netherlands

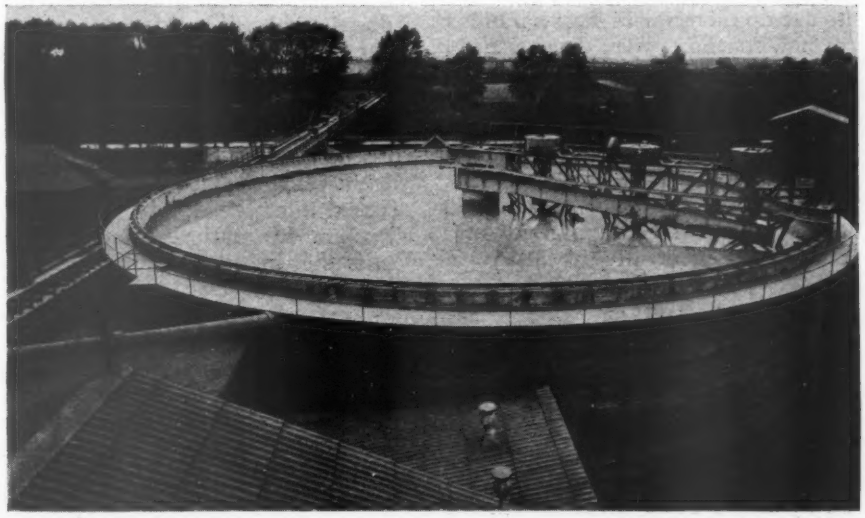
E. N. C. I. Soon after the liberation of Maastricht, Holland, by the U. S. 2d Armored Division, "Hell on Wheels," on Sept. 14, 1944, the Eerste Nederlandsche Cement Industrie Maastricht, Holland started producing cement for the Allied armies. The plant was not greatly damaged during the war. The fuel shortage was a handicap for a while but for the past several months the plant has been operating at capacity. Equipment and supplies are still hard to get.

Devastation in Holland was terrific with 85,700 houses completely destroyed and 400,000 damaged. This, together with the fact that the building of houses was prohibited during the four years of German occupation, makes it apparent that there is a tremendous pent-up demand for all kinds of building materials including cement.

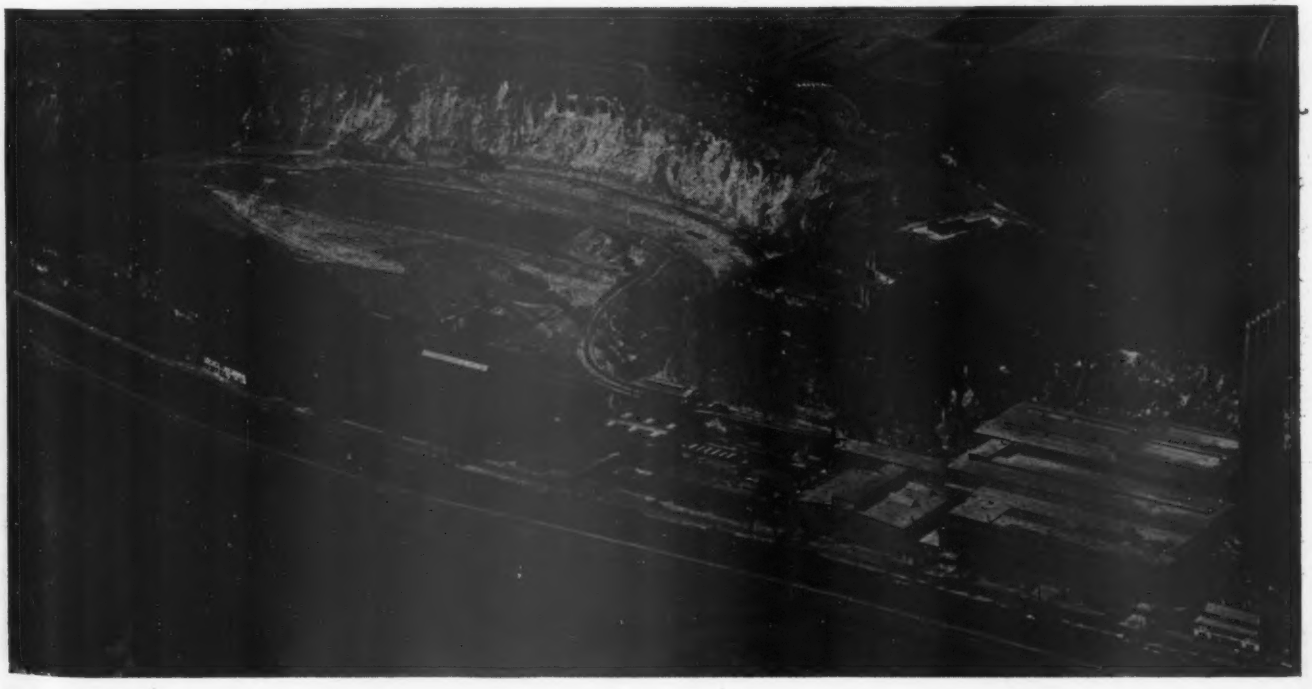
Germany

The cement industry in Germany suffered a considerable drop in production during the war just as in other countries. Statistics show that production in 1934 was at 51 percent of capacity and that it climbed to a peak of 94 percent in 1939 when production was 16,138,000 metric tons. Capacity in that year was 17,400,000 tons. Capacity was increased steadily until it reached a peak of 25,500,000 tons in 1943 but production dropped off to 40 percent in 1942 and 48 percent in 1943.

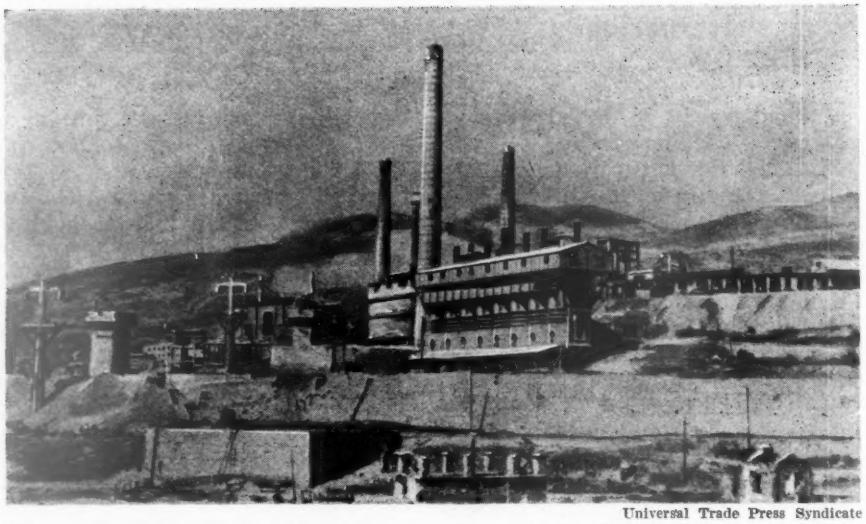
Cement experts sent to the U. S. and British Zones of Occupation in Germany over a year ago to study the German cement industry brought back some interesting facts. They report that: during the war the German cement industry developed no improvements in cement quality, but instead reduced quality



Right: The slurry reserve tanks at the plant of S. A. Ciments D'Obourg, Obourg, Belgium.



The plant of Eerste Nederlandsche Cement Industrie, Maastricht, Holland.



Universal Trade Press Syndicate

The cement works at Novorossiisk, Black Sea port in the Caucasus, Soviet Russia, which was destroyed by the Germans during World War II, is now being rebuilt. The first section of the reconstruction project was commissioned recently.

in order to economize on fuel and to use up more waste slag; a number of new machines were developed for use in the dry process of cement manufacture which predominates in Germany; vertical kilns are still used to some extent and make cement of poor quality; in spite of lack of uniformity of cement produced the concrete in German roads and structures is generally excellent.

Russia

Little is known about the cement industry in Russia or its extent of damage during the war. It seems certain that the damage was severe to those plants located in territory invaded by the Germans as the Russians, unlike other invaded nations, followed a scorched-earth policy and would have left no plants standing to be used by the enemy to further his conquests. The only item of definite information is that the cement plant at Novorossiisk, a Black Sea port in the Caucasus, which was destroyed by the Germans, is now being rebuilt. The first section of the reconstruction project is said to have been commissioned recently.

The portland cement industry in Russia began in the 70's of the last century in the central part of the country which is most hightly industrialized. The oldest plant is at Shtchurovo near Moscow. The industry developed slowly and by 1905 its output was only 3,7000,000 bbl. annually. By 1913 it had reached 12,200,000 bbl. but it dropped off again during World War I and ceased almost entirely during the Russian Revolution. Under Soviet rule the industry again began to function and by 1929 production was exceeding 13,000,000 bbl. annually. Under the first Five Year Plan the old plants were modernized and new ones built and by 1931 the capacity of the industry exceeded 19,000,000 bbl. During this period 19 of the 31 existing plants were modernized. From then until 1939, 16 new cement plants were built which had a total annual capacity of over 17,000,000 bbl. A number of other new plants have since been built but there is no available information on them. Most of the newer plants are wet process and all but a few of them use rotary kilns.

Greece

Word from Athens early in the year stated that the government had requisitioned all the cement plants in Greece in order to exercise the control necessary to promote a new reconstruction plan.

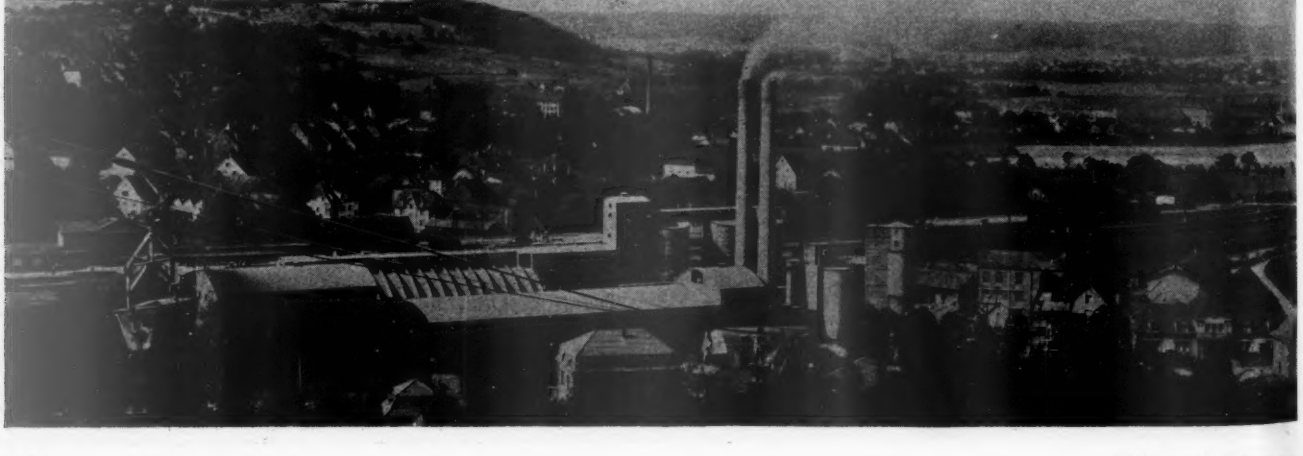
France and Colonies

The cement output in France before the war averaged about 4,000,000 metric tons annually, of which 400,000 tons was produced in Alsace-Lorraine. In 1938 imports totaled 63,000 tons and exports 407,000 tons. In 1941, after occupation by Germany, cement production totaled 3,100,000 metric tons; in 1942 this dropped to 2,050,000 tons, and in 1943 it went back up to 2,560,000 tons. Output for the first 6 months of 1944 was only 960,000 tons.

When the Germans occupied France they immediately made large requisitions of cement from the northern plants for the construction of the "Atlantic Wall" and numerous airports. In southern France, however, normal building construction was allowed to proceed until early in 1943 when much of the production there was also commandeered. In the spring of 1945, owing to the lack of coal, the output of cement in western and southwestern France was very small; it was only in the southeastern section where coal was available that the output approached pre-war levels.

The first claim for cement went to the Allied forces and the French National Railway came next. Now it is felt that if cement output can even approach the pre-war figures the most urgent needs of France can be satisfied over a period of years. Cement production during the first quarter of 1945 was 33 percent, and that in the second quarter 40 percent, of the 1938 output, or 115,000 tons monthly. In July produc-

The plant of S. A. des Chaux & Ciments Portland du Haut-Rhin, at Altkirch, France.



tion was 121,400 tons, and in August 109,000 tons.

The condition of the plants in general is good although the works at Colombelles, near Caen, were virtually destroyed and some damage occurred in the region of Boulogne-sur-Mer. The Central Office of Distribution of Industrial Products in 1945 estimated that only about 10 percent of capacity was affected and this could be repaired without much difficulty.

Colombelles The only cement plant completely destroyed was that of Cimenterie de Colombelles, near Caen (Calvados) and belonging to the Societe des Ciments Francais, 80 Rue Taithos, Paris.

This plant had 2 kilns and was using the slag produced by furnaces at Mondeville, adjacent to the cement works. This plant is located within 15 kilometers of Caen, where the battle of Normandy raged for over two months. These works were the theater of very heavy fighting by the Canadian Army and the destruction was carried out by gun-firing as well as by bombs. Reconstruction of this plant was begun during 1945 and the greatest part of the machinery was ordered from the United States. The first step includes one kiln, one Fuller cooler, three tube-mills and the packing plant. The second stage will be ordered in 1947. The first kiln to be installed will have a daily capacity of 400 tons.

Montebourg The plant of Ciments et Chaux de Montebourg (Manche) belonging to the Societe de Ciments Francais, was damaged about 75 percent during the war. It has two rotary kilns of 200 tons per day each, 10 vertical shaft kilns for lime. Montebourg is half way between Valaques and Cherbourg. Heavy battles took place in this district when the American Army, having broken the front at Carentan, advanced toward Cherbourg. Previously to that period these works were often bombarded by the R. A. F. and the American aviators in 1943 and 1944, previous to the landing because the Germans had established in the quarries of the works extensive concerns for assembling the V1 and V2 rockets and had several landing platforms for them against England (north part). The damages are being repaired by the Ciments Francais from French material and some machinery came from other works belonging to the same company. Production was resumed in 1946. Included in the program is the buying in the United States of one kiln with cooler and tube-mills.

Other Plants Although almost untouched by bombs and any other war acts, all the other French cement works needed serious repairs and overhauling at the end of the war because all of them had to produce cement during the occupation—4/5 for the German Army requirements—without having the necessary spare parts, attention, or chiefly the adequate oiling or greasing, because lubricants were almost nonexistent or of very poor quality, so that the machinery was in very poor condition. The program of repairs had been intensively carried out and about 2/3 of the cement works were in a position to resume at an average of 75 percent of their pre-war production as soon as coal became available. For these works, a first program of machinery to be bought immediately for replacing the machinery worn out beyond reasonable possible repair included: 4 rotary kilns with Fuller coolers, 12 tube-mills, 1 gyratory crusher, 2 hammermills, 12 packing machines, 12 power shovels (Bucyrus-Erie or Marion types), 40 Easton car units, compressors, (Ingersoll-Rand and Fuller), and various sundry machinery and materials. Orders have been placed in the United States and deliveries have begun. This program was approved by the French Government. Orders for a certain amount of machinery were also placed on the British market.

A second program for extensions is now in consideration by the French Government at the request of cement manufacturers and will probably be released in 1947. This will include about the same amount of machinery.

In Tunisia a new cement works is under study which will have two kilns of 400 tons per day each. This may make part of the program for 1947.

Haut-Rhin The plant of S. A. des Chaux & Ciments Portland du Haut Rhin at Altkirch is in the French province of Haut-Rhin, 18 km. south of the city of Mulhouse. It went into operation in 1927 and is equipped with equipment made by F. L. Smidth & Co., Copenhagen. This wet-process plant has two kilns 74 meters long which have a capacity of 180 tons daily each. The major problems at present are shortages of coal, electricity and spare parts, as a result of which the plant is operating at only 70 percent of capacity. Two Easton truck-trailers are on order for use in the quarry.

Lafarge The S. A. des Chaux & Ciments de Lafarge & du Teil, Paris, France, is planning an important program of modernization and new construction and the construction of two or more new plants. Only one of the company's 11 plants in France, that at Calais, was damaged during the war and this will be rebuilt. In north Africa the Pointe Pescade plant near Algiers will be rebuilt to produce 800 tons daily. A new 400-ton plant will be built 20 miles south of Oran, Algeria. Equipment for this has been ordered from the U. S. and includes 2 kilns, Fuller coolers, Easton cars, Bucyrus-Erie shovel, etc. In Morocco a third kiln, a 10-by 300-ft. unit, a Fuller cooler and grinding equipment will be added to the Dementerie Chreitiennes plant at Casablanca to increase its capacity to over 1000 metric tons of clinker daily. Further expansions in North Africa are also planned as it now produces only about a third of its requirements.

Calais The plant of Cimenterie de Calais, at Sangatte near Calais (Pas-de-Calais), and belonging to the Societe de Lafarge & du Teil, 30 Avenue de New York, Paris, was damaged about 50 percent. It has two kilns, 150 tons capacity each per day. These works were badly damaged during the battle of France, 1940, and were heavily bombarded by the R. A. F. in the succeeding year due to the fact that they were located near the Channel Coast and used by the Germans as stores and batteries cover against the English Coast. The necessary machinery is bought by the Societe Lafarge—1 kiln, 400 tons per day, tube-mills, etc.—and will be supplied from the U. S. A. Other machinery is supplied by Lafarge and will also consist of repaired machinery from these works themselves. Operations will probably start early in 1947.

Palestine

The Palestine Portland Cement Works, Ltd., Haifa, Palestine, formerly the Portland Cement Co. Nesher Ltd., is the sole producer of portland cement in Palestine, and one of the largest in the Near East. It is located near Haifa, the thriving port and industrial city from which highways and railways radiate to all parts of the country. In 1946 about 260,000 metric tons of cement was

produced, about 7 times as much as in 1926, the first year of production.

The plant now has six shaft kilns, each with a daily capacity of 110 tons and a 330-ton capacity rotary kiln. As the huge post-war demand of the Palestinian market far exceeds the capacity of the plant a large expansion program has been decided on. This includes the installation of a 400-ton rotary kiln, two 20-t.p.h. grinding mills, packers, pumps, and all the other equipment needed to add a new plant to the existing one.

South Africa

Vickers-Armstrong, Ltd., have on hand orders for 4 rotary kilns and coolers, 4 raw-grinding plants and a crushing plant for extensions to various cement plants in South Africa.

Iraq

The Iraq Building Material Co., Baghdad, Iraq, is planning to build a cement plant with a daily capacity of 300 metric tons.

A second firm, the Iraq Cement Co., also of Baghdad, was forced to delay work on its new plant because of floods. This plant will have a capacity of 250 metric tons daily.

Philippines

Cebu In the Philippine Islands the production of cement in 1940 by the Cebu Portland Cement Co., the chief producers, totaled about 1,020,000 bbl. and about the same for the first 11 months of 1941. No information is available on the cement produced during the Japanese occupation but enough coal was stored at the Cebu plant at the time of the invasion to produce 250,000 bbl. of cement and this coal was all gone when the Japanese were driven out.

In 1945 cement output totaled 160,000 bbl., most of this produced between May 13 and October 31, when the Cebu company was being operated by the U. S. Army. From that date on the plant has been operated by the civilian management of the company.

China

The Chinese cement industry got its start about the beginning of the present century when a small shaft-kiln plant was built near Tientsin. Development was slow for some years but by 1937 there were 7 plants with a total capacity of 6,600,000 bbl. annually. During the 8 years of war with Japan China was blockaded off from the rest of the world. All the big cement plants were located near the coast and were in the hands of the Japanese. In order to supply the wartime need of Free China 9 new cement plants were built during the war at interior points. Only two of these used rotary kilns and the combined capacity of all 9 was only 1380 bbl. daily.

After V-J Day it was found that some of the recovered plants had been destroyed or their equipment stolen, with the result that only 7 were able to operate and these had a total capacity of 4,470,000 bbl. Added to these was a new plant built by the Japanese at Luiliho. Plans for the reconstruction and development of China, both industrially and agriculturally, will call for many times the amount of cement the existing plants can produce. Steps are already being taken to build new plants, the first one being the Hwa Hsin Cement Company's plant near Hankow. This will be a 6,000-bbl. a day wet-process plant and will use largely Allis-Chalmers equipment. This plant is expected to be in full operation by early 1948. Other new plants will follow. The war damaged plants, it is said, will be rebuilt by UNRRA with equipment from discontinued operations in the United States.

Ceylon

Vickers-Armstrong, Ltd., have an order for the machinery for a complete 100,000-ton cement plant for Ceylon.

India

A cement company in India has ordered kilns and mills from Vickers-Armstrong, Ltd.

Formosa

The island of Formosa, off the coast of China, suffered a serious industrial setback during the war, in part due to bombing by U. S. air forces. The island's three cement plants, once producing about 12,000 bbl. daily, are now producing about 1,000 bbl. Plans are under way to rebuild these plants and replace damaged equipment.

Australia

Australia also is suffering from a shortage of coal and, as a result, the production of cement nearly stopped late in 1945. This made it impossible to make much progress on the housing so badly needed, but this would have been held up anyhow as all the building unions were on a "go-slow" strike and were only working at about half capacity.

The latest reports indicate that there is a large potential building program in Australia and that the present output will meet all requirements. All plants in Australia are embarking upon some form of post-war expansion or reconditioning.

New Zealand

Golden Bay The Golden Bay Cement Co., Ltd., Wellington, N. Z., plans to initiate the shipment of bulk cement and coal by water. It is also planned either to expand the present 420,000-bbl. plant or build a new one.

Tasmania

Goliath The Goliath Portland Cement Co., Ltd., Railton, Tasmania, reports that during the war its trade fell to less than 50 percent of normal due to the shortage of shipping space to the mainland states which normally take 70 percent of its output. Recently this trade has increased sharply due in part to a coal shortage on the mainland and the plant is now operating at full capacity.

During the war the only major improvement made was the installation of an automatically-controlled barney car system for hauling loaded limestone trucks from the quarry floor up to the crusher level. The truck automatically trips switches at both ends of the incline to stop and start the car. The cement plant contains an 8- by 10- by 265-ft. Smidth kiln and two 7¼- by 36-ft. tube mills. The kiln was fitted with a Miag Calcinator in 1936 and with a British Rema coal plant somewhat later. These units are said to be operating very satisfactorily, making possible an output of 1800 tons per week with a coal consumption of less than 1,000,000 B.t.u. per bbl.

An older kiln with balanced milling capacity is available but insufficient manpower is available to operate this at present. Both standard portland and low-heat cements are made.

A plant to manufacture asbestos-cement sheets and products is now nearing completion at a site near the cement plant. Consideration is also being given to duplication of the main cement plant at a somewhat later date when conditions become more stable.

A contract for 150,000 barrels of cement for use in the construction of the Bluestone dam on the New River near Hinton, W. Va., was awarded to the Lehigh Portland Cement Company of Allentown, Pa. The figure, announced by the district U. S. Engineers' office, was $285,550.

Sand and Gravel Technicians Attend Short Course Offered by N. S. G. A.

another ON THE SPOT report

DURING the week of November 18, the National Sand and Gravel Association conducted a short course of instruction for sand and gravel technicians. The course, held at the University of Maryland, College Park, Md., included lectures, laboratory demonstrations, inspection trips and a review of current knowledge of mineral aggregate technology, emphasizing specifications and test methods.

Stanton Walker, director of engineering for the association, with S. S. Steinberg, dean of engineering at the U. of M., was responsible for the organization of the course and led many of the discussions and demonstrations. He was ably assisted by Fred F. Bartel, assistant director of engineering, D. L. Bloom, associate research engineer, and Edward Ziegler, also a member of the association's engineering staff. Other lecturers participating in the course represented the National Bureau of Standards, the Public Roads Administration, and the Asphalt Institute. Twenty-eight representatives from member companies attended this course of instruction which, accordign to present plans, will become an annual event. This sort of association sponsored activity is not common, and the sand and gravel industry will be quick to recognize the fact that the N. S. G. A. is progressive in rendering this service to its membership.

On Monday morning, November 18, the class assembled in the Administration Building of the university to hear Dr. H. C. Byrd, president of the U. of M., describe the purpose and aim of the institution which he heads and to welcome the class by offering complete freedom in the use of the university's facilities. Dr. Byrd stated that the university's participation in the National Sand and Gravel Association's short course was part of its duty and he expressed an appreciation for the opportunity to work with and serve industry.

Unforeseen circumstances prevented R. N. Coolidge, president of the N.S.G.A. from attending the course. Mr. Coolidge was scheduled to present the opening address of the course.

Vincent P. Ahearn, executive secretary of the association, in describing the development of the N.S.G.A. and its objectives, expressed the opinion that the association should render a definite service to each member company. He continued by further explaining the functions and programs of the association and to comment on the conditions affecting the sand and gravel industry. Mr. Ahearn also advised that current building restrictions, channeling materials into residential construction, would greatly affect the industry.

Following Mr. Ahearn, Stanton Walker gave a brief but detailed explanation of how the course would be handled and the objectives to be achieved. The program outline of the course was explained, and it was brought to the attention of the class that, at various times throughout the course, time would be allotted for discussion of specific problems or questions introduced by the members.

With the preliminary talks and explanations out of the way, Mr. Walker introduced the first speaker on the course schedule, Herbert A. Insley, assistant chief, Clay and Silicates Division, National Bureau of Standards, who talked on "The Origin of Sand and Gravel and Other Mineral Aggregates." Mr. Insley's discussion covered the basic theory of how the earth's crust was formed, and what agents have caused variations in the geological formations of the various layers of materials.

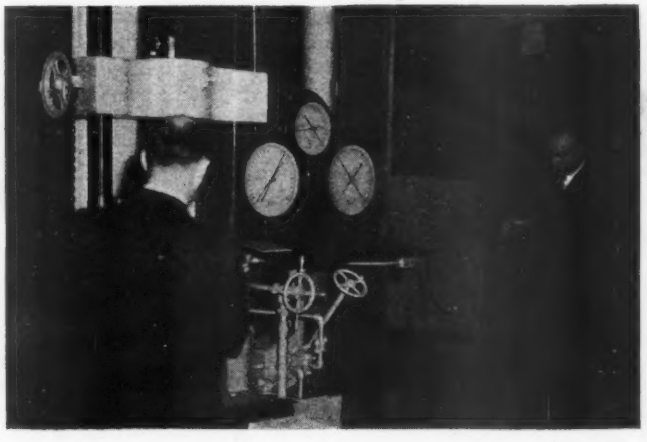
The first afternoon session got under way in the Materials Testing Laboratory in the Arts and Science Building, where Fred F. Bartel gave a summary of the investigations conducted by the association's research foundation at the University of Maryland.

The research laboratory was founded in 1928 and came to the university in 1938. The principal duty of the research laboratory is to try to solve producers' problems, using the testing machines available both in the laboratory and at the university.

One of the machines used (see illustration), is a dynamic or sonic testing device which determines the frequency at which a test sample of concrete attains its maximum period of vibration. The fundamental frequency is a function of the dimensions, density, and modulus of elasticity. The first two are readily determined factors, making it easy to quickly calculate the modulus of elasticity, which in turn gives valuable information about what is hap-

• Below, left: D. L. Bloom demonstrates the sonic testing device to determine the natural period of vibration of the concrete core at the right. (No, not the interested bystander; that's George Walton, Stewart Sand and Material Company, Kansas City, Mo.)

• Right: Stanton Walker has just explained the operation of the hydraulic press in the background. This press is used in strength determination tests.



• **Left: Dean Steinberg says a few words at the Thursday evening banquet. Reading from left to right at the guests' table: Dean Steinberg, Douglas E. Parsons (partially hidden), E. F. Kelly, Stanton Walker, Harold Allen, John Dwyer.**

• **Right: Stanton Walker has evidently announced that any of the banquet guests desiring to make after-dinner speeches should limit such to five minutes.**

pening to the concrete as it is subjected to freezing and thawing tests. The frequency squared is proportional to the modulus of elasticity. Sonic vibration tests permit the use of five specimens where 100 were required with previous methods. The standard method of freezing and thawing used in the laboratory is freezing in air at 0 deg. F., and thawing in water at 40 deg. F.

D. L. Bloem gave a summary of the investigations conducted by the National Ready Mixed Concrete Association in the laboratory. The effects of air-entraining cements, lean mixtures, and other variables have been studied.

Stanton Walker used a paper from the last annual convention as a basis for a short talk on specifications.

The second day of the course began with a lecture on "Mineral Aggregates in Soil Stabilization," by Harold Allen of the Public Roads Administration. Mr. Allen described various methods of stabilizing the different types of soils and explained that the characteristics of the soils must be determined before stabilizing measures can be undertaken. He went on to describe the two methods of determining soil characteristics and the system of classification as used by the P.R.A. A discussion of the plasticity index of soils and the methods of deriving it were described and demonstrated. A comparison of results obtained by the various methods brought Mr. Allen's talk to a close.

The next subject discussed was "Bituminous Mixtures—Types and Grades of Bitumens and Mixtures," by George Dent of the Asphalt Institute. Lantern slides were used by Mr. Dent to illustrate points brought out in his discussion, and in conclusion each member of the class received valuable literature on this subject, made available through the institute. A general discussion period followed with everyone taking an active part in presenting specific questions, answers and suggestions.

The entire afternoon was devoted to an inspection tour of the Public Roads Administration laboratory. Messrs. Allen, Barber, and Willis of the P.R.A. conducted the tour and gave demonstrations in explaining the research studies performed in the mechanical testing laboratory and sieve analysis laboratory. Since the tour was conducted on an informal basis, questions flowed freely and more often than not led to deep-rooted discussions involving the laboratory engineers as well as the students.

At the Wednesday morning session Stanton Walker spoke on the size analysis of aggregates. He pointed out that any material can be graded any way the individual desires, provided that the sizes are available in the deposit, and in commercial work, assuming it is economically feasible. He then discussed the effect of aggregate size on various materials, including concrete, railway ballast, filtration gravel and traction sand. The work of Fuller, Abraham and Talbot was also discussed.

Fred Bartel then spoke on sizing, and covered computations based on size analysis, including fineness modulus, combined gradings, effective size and the uniformity coefficient.

Reporting at the Materials Testing Laboratory for the afternoon session, the students heard a talk on "Miscellaneous Tests of Aggregate—Their Use and Significance," by Stanton Walker. As a part of his presentation Mr. Walker answered questions and discussed specific problems which the class introduced, relative to a particular plant problem.

Edward Ziegler took up the general subject, "Specific Gravity and Absorption—Determination and Calculation." He explained the A. S. T. M. specifications for determining specific gravity and described acceptable methods for this determination as well as for measuring absorption. Calculation of specific gravities was explained by the derivation of formulae used in finding specific gravities; and practical problems were solved as an illustration of this method.

In discussing the "Determination of Surface Moisture," D. L. Bloem explained the factors and derived the formulae involved in the determination of percent of surface water in aggregates. The various methods of determining surface moisture were described and illustrated by solving typical practical problems.

The third day of the course was brought to a close with a lecture and demonstration of calculation procedure as a part of Fred F. Bartel's subject, "Soundness and Durability Tests," and a description of "Methods of Test for Abrasion," by Edward Ziegler.

The first order of business at the Thursday morning session was a "Review of Specifications and Methods of Design for Concrete," by Stanton Walker. To augment the theoretical with the practical, Mr. Walker followed through with a hypothetical but typical problem involving specifications and concrete design considerations.

Under the general subject of "Design of Concrete Proportions for Specified Water Ratio or Cement Content," D. L. Bloem lectured on the "Use of Fineness Modulus to Select Aggregate Proportions." This discussion centered around the calculation of the fineness modulus and its application in solving practical and typical concrete design problems which were followed through, step by step, in designing concrete and determining the proportions in the mix. Another approach to the same problem was taken up by Mr. Bartel in his address on the "Use of Voids in Coarse Aggregate to Select Aggregate Proportions."

A second inspection of the Public Roads Administration laboratory was made on Thursday afternoon. This visit was confined to demonstrations in the concrete laboratory. A discussion of "Identification of Soft Particles" was taken up by D. O.

Woolf with demonstrations of the many techniques employed in the laboratory in an attempt to classify particles as hard or soft. The advantages and disadvantages of each method of test were discussed as were the theories behind the development of each type of test. It was evident however, that even with the extensive studies made by the P.R.A., there is yet to be found a completely satisfactory test for identifying a soft particle. The first progressive step in this direction will be to arrive at a definition of what constitutes a soft particle.

On Friday morning, Mr. John Dwyer, of the National Bureau of Standards, gave the opening lecture. He discussed the various types of portland cement, and N.B.S. specifications from the Bureau's standpoint. Tests made by the Bureau, with an explanation of the errors made, and attention to detail necessary were also covered.

Following this, Stanton Walker gave a brief history of air-entrained concrete, and explained why and where it is valuable. In design, the entrained air permits the use of less sand and mixing water. This was followed by a demonstration of the methods of determining the amount of air in air-entrained concrete, using both a commercial and laboratory type device. Both utilized the same principle, that of compressing the air within the concrete, and measuring that amount of compression. (See page 193.)

The final instruction session of the course came on Friday afternoon. This entire period was devoted to the solving of typical problems which were based on the discussions and lectures of the preceding sessions. Mr. Bartel was in charge of this period of review and gave his assistance when required by a student. The problems were practical in nature and required a comprehensive understanding of the work covered by the course.

The course was brought to a close on Saturday with a final examination. The examinations are to be graded with no intention of providing the students with a competitive score of proficiency, but rather to show the student where he could best devote his future study. A second purpose of the examination was to show Mr. Walker and his associates just where or how changes in future courses could advantageously be made.

A most enjoyable banquet at the Statler Hotel in Washington, D. C., on Thursday evening provided the students with a diversion from the intensive classroom and laboratory lectures.

The class included the following representatives of the sand and gravel industry:

W. B. Herbert, Jr., Sangravl Company, Nashville, Tenn.
S. Larsen, Sangravl Company, Nashville, Tenn.
L. I. Johnstone, Graham Brothers, Inc., Los Angeles, Calif.
Charlton Dunn, Graham Brothers, Inc., Los Angeles, Calif.
Daniel J. Miller, Jr., Portland Sand & Gravel Co., Bangor, Pa.
William E. Price, Wyoming Sand and Stone Co., Scranton, Pa.
Franz Stein, H. L. Seabright Co., Wheeling, W. Va.
Gilbert R. Fuller, Portsmouth Sand and Gravel Co., Portsmouth, O.
Gene Mason, Concrete Materials Company, Des Moines, Ia.
J. L. Shiely, Jr., J. L. Shiely Company, St. Paul, Minn.
Robert C. Shiely, J. L. Shiely Company, St. Paul, Minn.
Allen Potts, Southern Materials Company, Inc., Richmond, Va.
Raymond Wingo, Jr., Southern Materials Company, Inc., Richmond, Va.
Edward P. Kolb, Windsor Building Supply Company, Newburgh, N. Y.
F. C. Leverette, PIT AND QUARRY, Chicago, Ill.
R. W. Spake, PIT AND QUARRY, Chicago, Ill.
Everett Jumper, Consolidated Rock Products Company, Los Angeles, Calif.
Edward L. Howard, Jr., Pacific Coast Aggregates, Inc., San Francisco, Calif.
M. L. Hurst, C. W. Shirley, Waterloo, Ia.
P. Cresto, Conco Building Products, Inc., Mendota, Ill.
Richard J. Nugent, Nugent Sand Co., Inc., Louisville, Ky.
George Walton, Stewart Sand and Material Company, Kansas City, Mo.
Alan B. Brewer, Dravo Corp., Pittsburgh, Pa.
Richard Davison, J. K. Davison Bros., Pittsburgh, Pa.
Joseph V. Clisham, The Arundel Corp., Baltimore, Md.
William I. Miller, The Arundel Corp., Baltimore, Md.
Charles E. Webb, Southern Railway Company, Alexandria, Va.
George H. Witherell, Hornell Gravel Corp., Buffalo, N. Y.

U. S. Cement Industry

(*From page* 106)

Olympic The Olympic Portland Cement Co., Bellingham, Wash., is said to have its extensive improvement program near completion.

South Dakota Extensive improvements are reported to be under way at the South Dakota Cement Plant, Rapid City, S. D. These include the installation of two Raymond direct-firing bowl mills.

Aetna The Aetna Portland Cement Co., Bay City, Mich. is continuing its modernization program begun in 1945. Two new cement storage silos will be built, bulk cement loading equipment will be added, and new dust collectors will be installed in the packhouse.

Diamond The Diamond Portland Cement Co., Middle Branch, Ohio, will install a third kiln equipped with a Vanderwerp recuperator.

PUERTO RICO

Puerto Rico The Puerto Rico Cement Co. at San Juan which made many changes in 1946, is spending about $500,000 on further improvements which will increase production to about 1,000,000 bbl. annually. New equipment ordered or on hand includes a 250-t.p.h. Dixie Mogul hammermill, a 2½-cu. yd. Bucyrus-Erie electric shovel, three Easton 10-cu. yd. trailers, a new 8½- and 10- and 8½- by 300-ft. Allis-Chalmers kiln, a 4-tube St. Regis packer, etc. Five new silos have already been built to double the cement storage capacity.

Ponce The Ponce Cement Corp. at Ponce has an ambitious program for 1947 which will raise its capacity from 2600 bbl. up to 4350 bbl. daily. The most important addition will be a 9 ft. 2 in. by 324 ft. F. L. Smidth kiln with a 10-cyl. Unax cooler. The kiln will be complete with conveyors, drive, feeder, oil preheater, fan, control panel, and an 8- by 150-ft. concrete stack. There will be two new slurry storage basins, a Wilfley slurry pump and Chicago Pneumatic compressors for agitation. New Allis-Chalmers 600-hp. synchronous motors will speed up the two raw mills and increase their capacity to take care of the new kiln. The second of the two finish mills will be connected to a new 16-ft. Raymond separator and Sly dust collector as the first one is now. Packing capacity will be doubled by the installation of two more St. Regis packers. A fourth 1,000-kv.-a. Westinghouse transformer will be added and a 1,000-kv.-a. diesel generator will provide emergency power for the kilns. Many other changes are to be made. In the future is a steam generating plant which will have two 2400-kv.-a. turbo-generators.

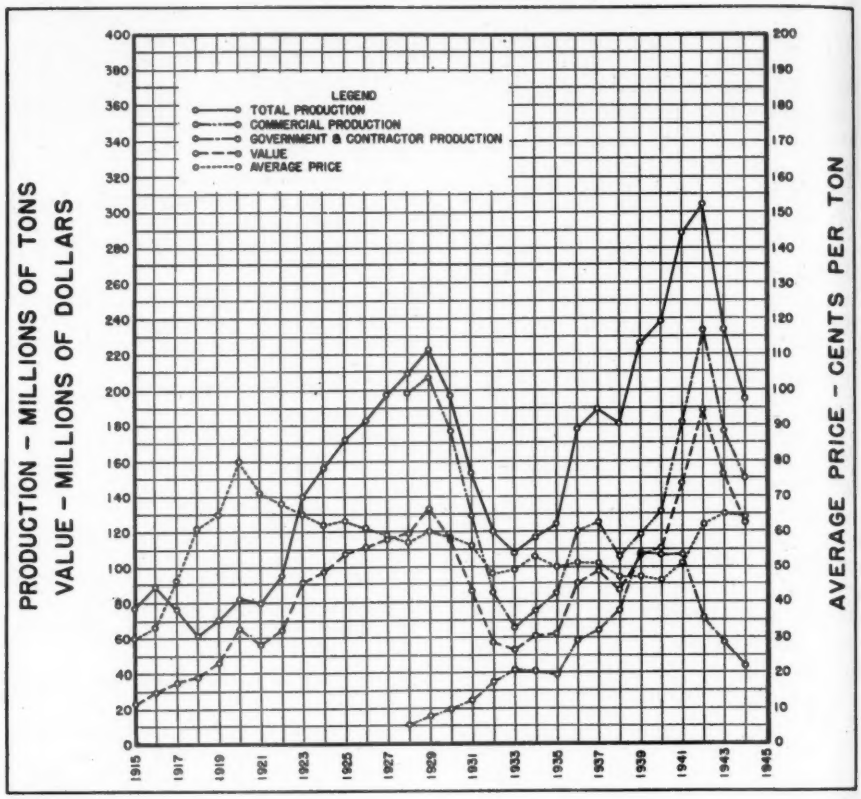
In 1946 a 2-cu. yd. Lorain diesel shovel and three 15-ton White trucks were added in the quarry. A second Smidth No. 2411 Unidan mill was added for cement grinding.

Aggregates Industries in '46 Showed Effects of Increased Construction

Sand & Gravel Output Up 48 Percent; Production of Stone Hits 190,000,000 Tons With 25 Percent Sales Rise

INSOFAR as labor, material and equipment shortages permitted, practically all branches of the far-flung aggregates industries operated at or near capacity throughout the year just closed. In some areas, particularly in the south, acute distress resulted from the inability of producers to keep pace with soaring demands, and in all sections of the country there existed a tremendous unsatisfied demand for lightweight aggregates.

The sand and gravel industry, which suffered most throughout the late war years due to the curtailment of all classes of construction, bounced back vigorously in 1946 with a thumping 48-percent increase in output. The gain, which seemed to be spread broadly throughout the industry, brought the level of production to 290,000,000 tons compared with 196,000,000 tons in 1945. Production in the Los Angeles metropolitan area established a new record of 19,000,000 tons for the year, and activity in the San Francisco area was reported to be at peak levels.

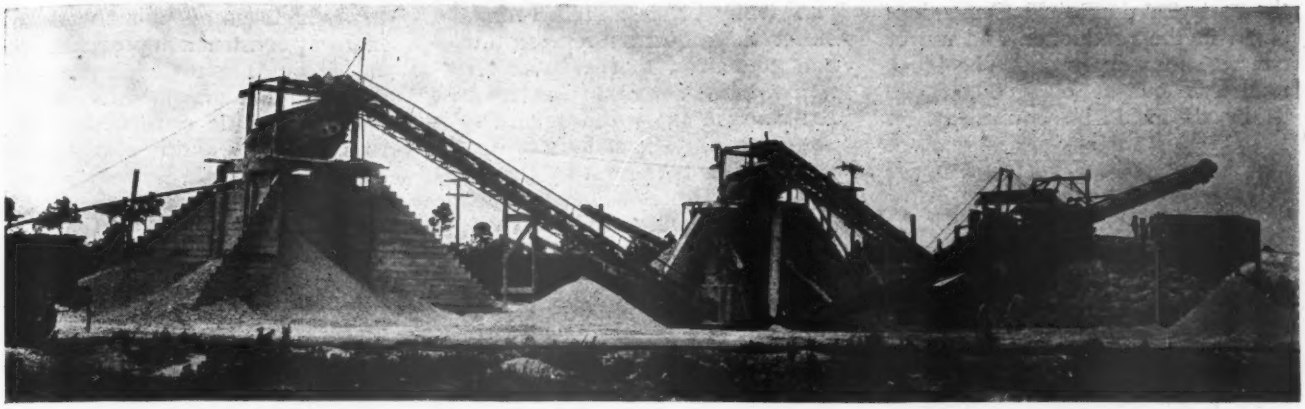


Production of sand and gravel in the United States, 1915-1944—a graph prepared by the National Sand and Gravel Assn. and based on data from reports of the U. S. Bureau of Mines. Output in 1946 was close to the all-time record set in 1942, when war construction was at its peak.

Although stone used as aggregates made large gains during the year, this was offset to some extent by a decline in metallurgical and agricultural demands. The total output of stone, aside from that used in the manufacture of cement and lime, amounted to about 190,000,000 tons with a value of $240,000,000. The over-all gain in sales of stone was approximately 25 percent.

According to the latest Bureau of Mines figures, production of railroad ballast (stone, gravel, and slag only) amounted to 45,355,073 short tons with a value of $26,712,779. Although no figures were

Portable plants for the production of agricultural limestone were increasingly popular in 1946. This plant is operated by E. E. Porter & Sons near Roscoe, Illinois. Under ideal conditions its productive rate is over 225 t.p.h.



A number of new crushing and screening plants got into operation during 1946 to relieve accute materials shortages. One of these was the Deerfield Quarries plant at Deerfield, Florida. This plant crushes, washes and screens about 70 tons of oolitic limestone per hour.

available for 1946, the output must have been at least 20 percent greater than in 1945. A survey by PIT AND QUARRY of twenty railroads drew replies indicating that 1947 demand for ballast will at least equal (and in all probability will somewhat exceed) the 1946 level.

Cement shipments, usually a good barometer of conditions in the aggregates industries, increased from less than 108,000,000 barrels in 1945 to 171,000,000 in 1946, a gain of more than 58 percent. This output must be a fair indication of the industry's capacity (at least under the conditions that existed throughout most of the year), for almost all sections of the nation suffered in some degree from shortage of cement. How much additional output could have been consumed during the year is problematical; but there was surely a market for not less than 200,000,000 barrels.

With the cement bottleneck almost certain to be broken early in 1947, the aggregates industries could well afford to take stock of their own position in relation to the anticipated construction boom. Although there were some soft spots, the general picture was surprisingly bright. Despite the urgent demand for production throughout most of 1946, plant renovation and expansion programs were undertaken on a large scale and with considerable success.

By almost any yardstick of measurement or comparison, the physical plant of the aggregates industry was in top notch condition at the outset of 1947. Whether or not capacity would prove equal to demand seemed almost wholly dependent upon how uniformly demand would be distributed, throughout the year. A sudden rush of both public and private construction could, and probably would, result in temporary shortages in some localities, but the possibility of any general or long-enduring shortage of aggregates seemed comfortably remote.

The job ahead for the aggregates industries could be gauged with some accuracy by forecasts of construction volume in 1947. F. W. Dodge Corp. predicted that public works and utilities projects would increase 22 percent over 1946, with residential work gaining 35 percent in volume and nonresidential 7 percent. A survey of the 37 states east of the Rocky Mountains indicated that expenditures on all types of construction would amount to $9,500,000,000 in 1947, as compared with $7,700,000,000 in 1946. Since this sharp increase was weighted heavily in favor of public works projects of various kinds, it would inevitably create a larger market for sand and gravel and crushed stone.

Residential construction work, once regarded as relatively unimportant in the over-all aggregates picture, assumed a new importance in

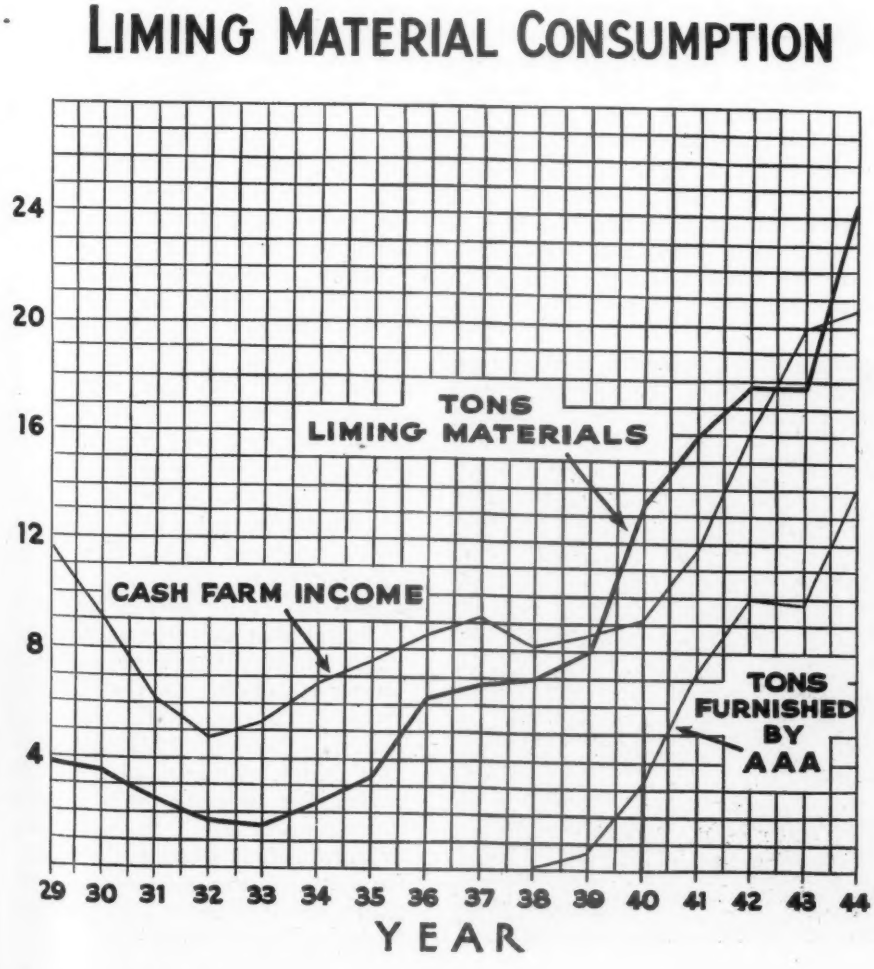


Chart shows the tonnage of all liming materials used by farmers in the United States from 1929 through 1944. Although there is a definite relationship indicated between consumption and cash farm income, the A.A.A. program has obviously been the more important factor.

the past year due to the tremendous boom in the production and use of concrete masonry units. The block industry's output of 1,000,000,000 8- by 8- by 16-in. equivalents in 1946 represented consumption of approximately 18,000,000 tons of aggregates of all types. In the heavy block consuming areas (particularly in the south), aggregates producers had their troubles keeping pace with the demand for sizes of material suitable for making blocks. While few block plants were actually shut down for lack of aggregates, many were forced to operate on a hand-to-mouth basis.

Although there were many who doubted that the block industry would duplicate its 1946 performance in 1947, aggregates producers were disposed to recognize that the block industry had become a major market for their materials. The demand for lightweight aggregates alone in 1946 was many times greater than the supply, and there seemed good reason for believing that a major portion of this demand would become a stable, year-in-and-year-out market. Yet there were few indications that the lightweight industry was making any real effort to effect the needed increase in productive capacity.

Profit-wise 1946 was a so-so year for most branches of the industry, largely due to the death-throes tenacity of O.P.A. The industries' associations persisted in their efforts to bring about decontrol right up to the very hour O.P.A. expired, and their endeavors were just as persistently thrust aside. From the outset the industries representatives had contended that keen competition within their ranks was the best assurance in the world against runaway prices. The soundness of this position was borne out by the modest price advances which were made after the removal of ceilings.

Labor was definitely more plentiful throughout most of 1946, and the aggregates industries felt only indirectly the effects of the strikes and general unrest which characterized the year. Materials and equipment in many categories remained on the scarce list because too many workers were wielding picket signs instead of tools. Smart producers, as a by-product of their painful experiences with manpower shortages during the war, were focusing more attention than ever before on the labor efficiency of their plants. Quarry operations were being overhauled and mechanized on an almost unprecedented scale despite the difficulty of obtaining machinery. With workmen demanding (and getting) higher wages than ever before, aggregates producers were at last recognizing the desirability of employing more skilled workers and fewer common laborers. The spreading of this philosophy (and it was bound to spread) would necessitate some radical changes in methods, processes and equipment in the next few years.

Immediate prospects for the aggregates industries seemed bright at the outset of 1947. If the widely-predicted business recession took place during the year (53 of 72 non-government economists, surveyed by F. W. Dodge Corp., thought it would), the lid would almost certainly be taken off public works and highway construction programs, with an inevitable increase in the demand for sand and gravel, crushed stone and other basic construction materials. Either way the aggregates industries had little immediate cause for concern, and a recession was by no means inevitable. What the economist crystal gazers really saw in the offing was a moderate price recession—something that any Joe Bloke could predict just as accurately as they.

Some quarry operates were finding the drop ball an effective substitute for secondary blasting. View below was taken at the Lynn Sand & Stone Company's operation at Swampscott, Massachusetts.

AGRICULTURAL LIMESTONE

Although there were no figures available on the output of agricultural limestone in 1946, there were indications that the total was somewhat less than the 20,836,101 tons produced in 1945. Increased demand for construction materials was undoubtedly a factor in whatever drop there was, for agstone was no longer a by-product material, and crushed stone plants which operated at capacity could split production between aggregates and agstone. Since the 1945 production showed a drop of 2,047,465 tons from 1944, there was naturally some speculation concerning the possibility of a trend in the making. But every available survey still indicated that need and demand for liming materials were far in excess of the industry's productive capacity. The 8 percent drop noted in 1945 very probably reflected the long periods of heavy rainfall which not only interrupted production, but interfered with the movement of material to the farms.

If the demand for liming materials was actually on the downgrade, the most plausible explanation was that the agstone industry as a whole was still remarkably lethargic about selling its product. Most producers were happy enough to accept orders for their material, but few seemed willing or inclined to undertake aggressive merchandising programs with a view to increasing sales. There was perhaps a tendency on the part of producers to forget that the government purchase and distribution program was largely responsible for the rapid increase in the consumption of liming materials between 1938 and 1944 (see chart). Although there was no reason for believing that government support would be withdrawn or curtailed, it seemed about time for producers to make some tangible efforts to win more farmers over to the soil conservation idea.

THE STRUCTURE AND MINERALOGY OF BLAST FURNACE SLAGS-- PART II

By D. G. RUNNER
Materials Engineer
U. S. Public Roads Administration

Internal Structure of Slag versus Certain Physical Properties

another P-Q and Q exclusive

FROM all indications, the crystalline, partly crystalline and/or glassy phases of slag have some influence upon its physical properties. For example, Figs. 7, 8, 9, and 10 represent different phases of slag insofar as crystalline development and voids are concerned. The tabulation below indicates what effect upon certain physical properties is obtained by variations in internal structure.

Fig. No.	Structure	Voids	Specific Gravity	Wt/ft³	Absorption
7	Well crystalline.....	None	2.90	181	0.71
8	Partly crystalline.....	Some	2.60	162	0.89
9	Well crystalline.....	Some	2.43	152	1.22
10	Partly crystalline.....	Some	2.26	141	2.46

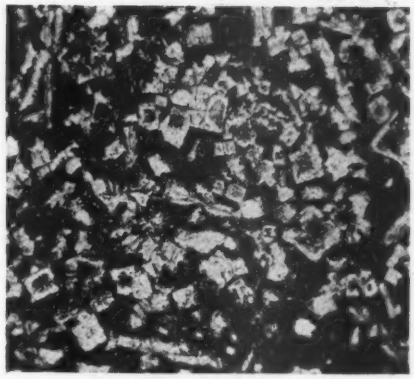
Fig. 7 shows no voids and the minerals present are well developed. This condition produces a slag of high gravity and weight per cubic foot, with relatively low absorption. Fig. 8 shows a partly-crystalline condition together with considerable glass and some voids, which decreases the specific gravity and weight per cubic foot and increases the absorption. Fig. 9 shows a well-developed crystalline mass with a small amount of glass and considerable voids. Here the gravity and weight per cubic foot are further decreased with resultant increase in the amount of absorption. In Fig. 10 is shown the fine-grained development of melilite in a heavy glass base together with a considerable amount of voids. Here the specific gravity and weight per cubic foot are the lowest of all four samples, caused possibly by the high glass content. The reason for such high absorption cannot be explained unless due to the presence of small voids some of which are shown in the photomicrograph.

In connection with a research problem[4] on samples of slag from three sources, an effort was made to determine the reason by microscopic methods, for variations in the Los Angeles rattler test results. Two of the three samples satisfactorily passed the prescribed limits for this test while the third sample did not. A preliminary examination of the materials in question showed that samples 1 and 2 were gray in color, while sample No. 3 was distinctly brown. Individual pieces from each sample ranged from dense to frothy in general appearance. When tapped with a hammer, samples 1 and 2 were very resistant, while sample 3 was brittle and easily shattered under the blows.

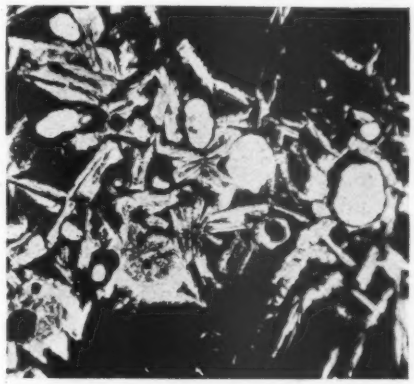
From all indications, the resistance of blast furnace slag to abrasion should be traceable to differences in mineral composition, structural relations, existent internal fracturing, unrelieved internal stresses and possibly other less obvious factors. A study of the three slags by means of polished sections indicated no significant differences. Fig. 11 is a photomicrograph of slag sample No. 1, showing typical lath-like crystals of melilite. Figs. 12 and 13 are views of slags 2 and 3 respectively. Fig. 13 is distinctive because of areas of glass which are full of inclusions. It will be noted that glass is rare or absent in Figs. 11 and 12 (slags 1 and 2).

It is well known that one reason for the toughness and abrasion resistance of diabase (trap rock) may be attributed largely to the interwoven structure of lath-shaped feldspar crystals. In blast furnace slags, there is a similar structure except that the interlocking mineral is melilite. Reference to Figs. 11, 12, and 13 will show that there is no great difference in the structures except that in Fig. 13 the crystals appear somewhat larger and in them the nacreous zones are much more pronounced. These, being discontinuities, could affect the abrasion resistance.

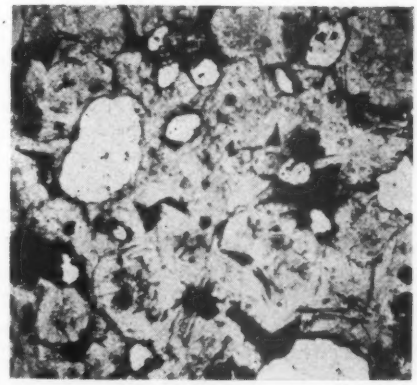
Some difference in structure between slag Nos. 1, 2, and 3 may be

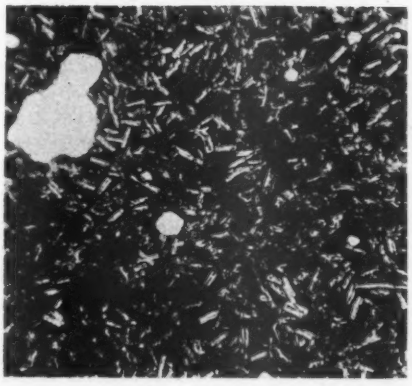


• Fig. 7. A moderately fine-grained slag composed of melilite, monticellite and glass.



• Fig. 8. A moderately fine-grained slag composed of tabular melilite crystals embedded in a glassy groundmass. Round white areas are voids.

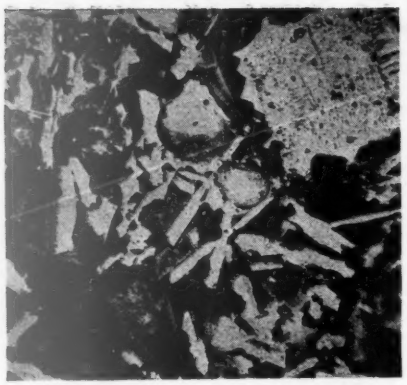




• Fig. 9. A fairly porous slag composed almost entirely of well-developed melilite crystals with a glass. Voids are indicated by the large white areas.

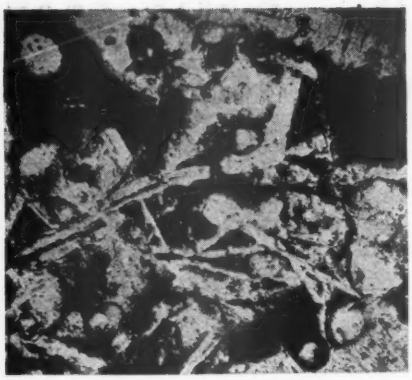
• Fig. 10. A fine-grained slag composed chiefly of well-developed melilite crystals in a glass base. White areas are voids.

4) Unpublished report of some examinations of slag samples made for the National Slag Association, by L. S. Brown, Consulting Microscopist.



L. S. Brown Photo

• Fig. 11. Slag No. 1, showing rectangular blade-like crystals of melilite.

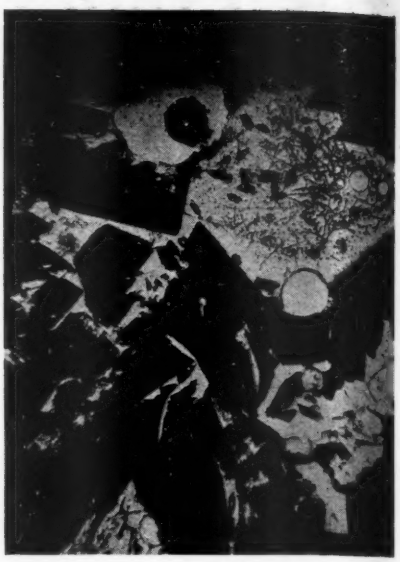


L. S. Brown Photo

• Fig. 12. Slag No. 2, showing typical development of melilite crystals.

L. S. Brown Photo

seen in Fig. 14. These figures are polished sections and are magnified 35 times. Note the difference in structure between slag No. 3 and the other two slags. In No. 3 the little parallel bright splashes are the dark curtain inclusions in melilite crystals; each pair outlines a crystal. The more or less dark material enclosing all these crystals is glass. Note that the glass is absent in slags 1 and 2 which are more uniform (finely crystalline). The darker gray specks, and one rectangle in slag No. 1 are melilite. Slag No. 2 shows very large crystals with the zoned curtain inclusions and a few small ones. From direct evidence, the brittleness and stressed internal condition offers the best explanation of the greater loss for slag No. 3.



L. S. Brown Photo

• Fig. 13. View of slag No. 3, showing two large areas of glass full of inclusions.

• Left: Fig. 14. Three polished sections magnified. (Left to right: Nos. 1, 2, 3.) Note the difference between No. 3 and the other two. In No. 3 the little parallel bright splashes are the dark curtain inclusions in melilite crystals, each pair outlining a crystal. The more or less dark material enclosing all these crystals is glass. Note that glass is absent in No. 1 and No. 2.

Additional Reading

1. *The Binary System Akermanite-Gehlenite,* by J. B. Ferguson and A. F. Buddlington, *Amer. Journal Science,* (4), 50, 131-140, 1920.

2. *The Ternary System CaO-Al$_2$O$_3$-MgO,* by G. A. Rankin and H. E. Merwin, *Journal Amer. Chem. Society,* 38, 568-588, 1916.

3. *The Genesis of Melilite,* by N. L. Bowen, *Journal Washington Academy Science,* 1923.

4. *Iron Blast Furnace Reactions,* by S. P. Kinney, P. H. Royster, and T. L. Joseph, Tech. Paper 391, U. S. Bureau of Mines.

6. *Chemical and Petrographic Comamination,* by Graham and Hay, *Foundry Trade Journal,* vol. 50, no. 925, May 10, 1934.

6. *Chemical and Petrographic Composition of Slag,* Pit and Quarry, vol. 47, no. 13, March 27, 1929.

Canadian Cement Industry

(*From page* 110)

at the Bamberton plant, together with draughting office and general engineering staff.

The British Columbia Cement Co. recently purchased 3,670 acres of land surrounding Horne Lake, near Qualicum Beach. The area contains one of the largest, if not the largest, deposits of limestone on the north Pacific Coast, according to N. A. Tomlin, managing director of the B. C. concern.

"Within the next two years the B. C. Cement Co. will probably construct a plant costing about $3,000,000 or $4,000,000, for the manufacture of portland cement," Mr. Tomlin stated.

Location of the plant would not be known until an exhaustive study and survey of the area had been made, he said, but it was certain that raw material needed for the plant's construction would be derived from the Horne Lake deposits.

"We have had under consideration for some time the locating of a second plant to manufacture Portland cement as an auxiliary to our Bamberton works."

The fact that the Provincial Government is developing the Campbell River power scheme was a contributing factor in purchase of the Horne Lake deposit, Mr. Tomlin disclosed.

"The power lines of the British Columbia Power Commission en route to Port Alberni pass through the land now owned by the B. C. Cement Co.," it was explained.

Decision by the B. C. Cement Co. to purchase the property was made after C. S. Williams, general superintendent, and Matthew Scott, quarry superintendent, with Mr. Tomlin, had made extensive samplings of the formation to ascertain its calcium carbonate, magnesia, silica, alumina and iron content.

"We proved beyond a doubt that the deposit was specially suited for the manufacture of portland cement, and the three of us were agreed that it was just as fine a formation as we had ever seen anywhere," Mr. Tomlin related.

Date on which construction of the huge plant necessary to turn the limestone into cement products will start depends largely on trade conditions.

Nonmetallics Used in Construction Scored Important Gains in Past Year

Agricultural Chemicals Lead General Upsurge, But Gains Are Well Distributed Among The Industries; Even Postwar Casualties Stage Comeback

GENERALLY speaking, production of the miscellaneous nonmetallics in 1946 reflected the upsurge in construction activity, particularly with respect to such directly-associated materials as gypsum, lime, roofing granules, asbestos, slate and rock wool. Figures on production during the past year were as usual too fragmentary to be of much use, but they for the most part substantiated the trends to be found in comparisons of 1945 output with 1944. Production of potash and phosphate rock continued to mirror the boom in farm activity, and even such inevitable post-war casualties as bauxite and crude magnesite showed surprising evidences of resurgence by mid-year. The total value of nonmetallic minerals (other than fuels) produced in 1946 was $1,300,000,000, compared with $956,000,000 in 1945—an increase of 36 percent.

Lime Monthly lime shipments as reported to the National Lime Association for the first six months of 1946 closely followed the pattern of 1945. In July and August, however, a sustained upward trend in production became apparent, in contrast to the steady drop recorded in the preceding year. Reported shipments, including both quicklime and hydrate, amounted to 177,528 tons in August, 1946, the most recent month for which figures have been released. This indicated total shipments for the industry of approximately 459,000 tons, compared with 364,000 tons in the same month of 1945, or an increase of 26 percent.

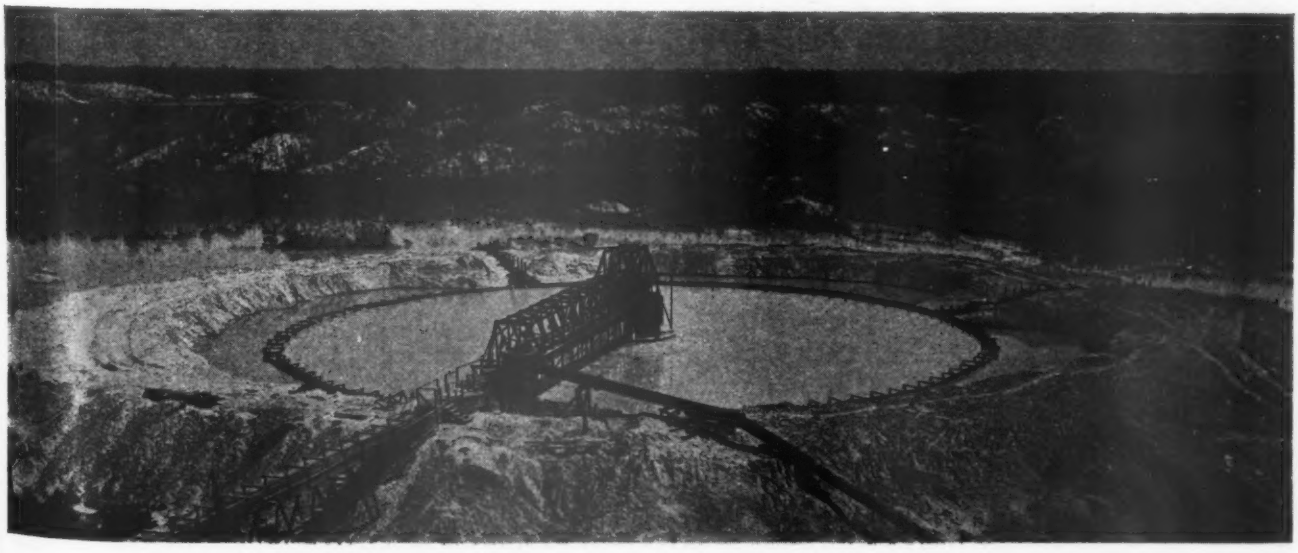
Plants in the lime industry came through the war years in good shape, and the only reconversion problem consisted in getting back into the production of types of lime which were dropped in the interests of the war effort. The year was marked by a resumption of full annual meetings of the National Lime Association, the first such gatherings to be held since 1941.

Gypsum From a wartime low reached in 1944, production of crude gypsum climbed to 3,811,723 tons in 1945, and nine output in the third quarter of 1946 showed a whopping 59 percent increase over the same period in 1945. Shipments of gypsum board and lath during the second quarter of the year totaled 725,000,000 square feet, and the annual output probably approximated 2,950,000,000 square feet, with lath accounting for about 39 percent.

This growing industry's confidence in the future was evidenced by new plant construction and expansion projects at many locations. National Gypsum's vast expansion program, originally announced as involving expenditures of $8,500,000 at Mobile, Alabama, Savannah, Georgia, Rotan, Texas, and other locations, has already been doubled in an effort to keep pace with the growing demands of the construction industry.

Rock Wool Manufacturers of rock wool during 1946 had only one serious problem: how to produce enough material to satisfy the soaring demands. The industry was at last feeling the full benefit of the excellent free publicity it received during the war, when home owners were exhorted to insulate as a patriotic duty. Although new cupolas were going into production at an impressive rate, it seemed probable that the backlog of orders would continue to grow well into 1947.

Several new plants in Canada were reported to be in—or on the verge of — production. Canadian Gypsum Company, Ltd., had completely rebuilt its plant at Weston, Ontario, destroyed by fire in February, 1945. Other new plants included Crang Industries at Toronto, and Gypsum, Lime and Alabastine's



An important technical development in the phosphate industry during 1946 was the installation of this 150-ft. torque-tube hydroseparator at Coronet Phosphate Company's Hopewell, Florida, washing plant. The machine was designed to effect the continuous recovery of fine phosphate rock present in washer debris.

installation at Caledonia, Ontario. One of the important new plants in the United States was Federal Portland Cement's $250,000 installation at Buffalo, New York. At the close of the year this modern plant was producing between 4 and 5 carloads of batts per day.

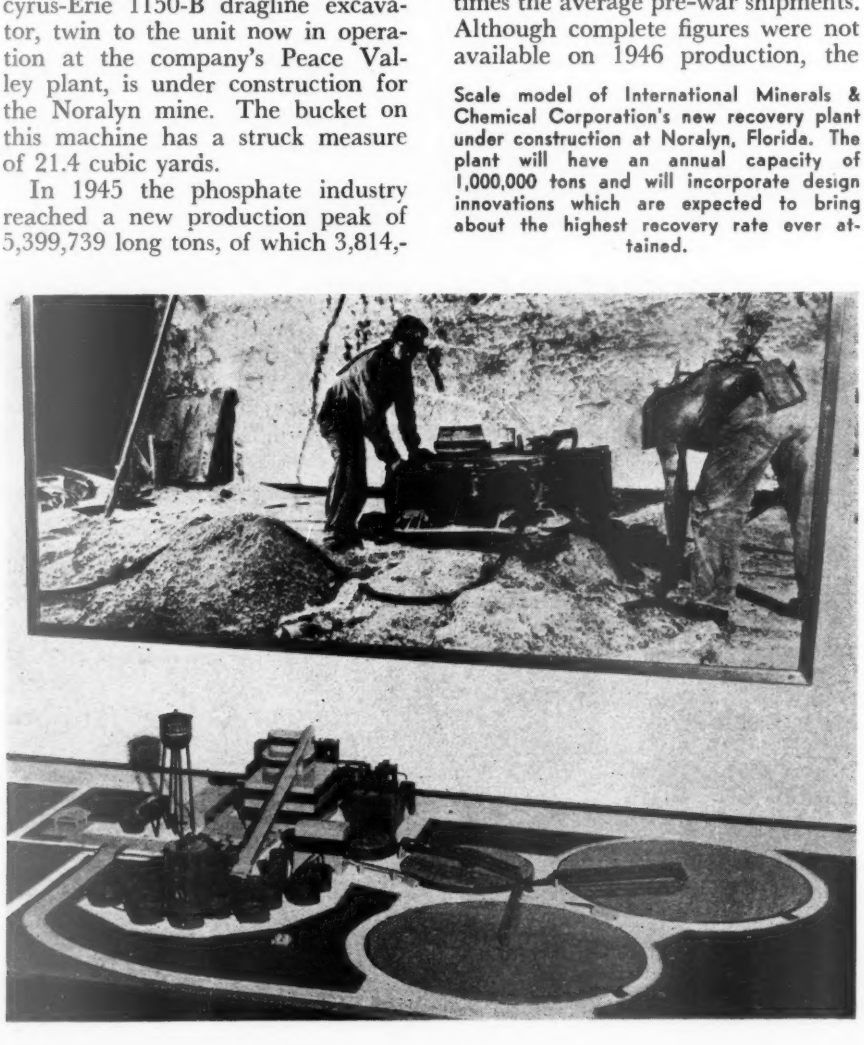
Phosphate Rock The phosphate industry continued to set new records in 1946. Total mine production in the first half of 1946 was 3,283,179 long tons with a value of $13,878,651. Sales during the first half of the year were more than 600,000 tons greater than in the corresponding period of 1945, while stocks of material showed a sharp drop. Land pebble phosphate from the Florida fields continued to lead all other grades by a wide margin, and Florida shipments increased to more than three times its nearest competitor, Tennessee.

A new recovery plant under construction at Noralyn, Florida, by the International Minerals & Chemical Corp., was expected to have a capacity of 1,000,000 tons per year—more phosphate than has ever been mined from a single deposit. A Bucyrus-Erie 1150-B dragline excavator, twin to the unit now in operation at the company's Peace Valley plant, is under construction for the Noralyn mine. The bucket on this machine has a struck measure of 21.4 cubic yards.

In 1945 the phosphate industry reached a new production peak of 5,399,739 long tons, of which 3,814,935 tons came from Florida. From all indications, production in 1946 must have exceeded 6,000,000 tons, and there was every prospect that 1947 production would exceed even this record output.

Operations of the Barnsdall Tripoli Corporation were reviewed in April, 1946, issue of Pit and Quarry. This modern mill produces 10 tons per hour of powdered Tripoli, which is used as a mild abrasive in scouring and polishing powders and as a rubbing compound on lacquer surfaces.

Barite The output of primary barite in 1945 amounted to 690,152 short tons—35 percent more than the previous record established in 1944. Shipments of ground barite used in oil well drilling reached a new record of 413,620 short tons, or approximately three times the average pre-war shipments. Although complete figures were not available on 1946 production, the high level of operations in consumer industries indicated an increase over the 1945 output. Production in the third quarter of 1946 set a new high for the industry, amounting to 201,197 short tons. This was 2 percent greater than for the comparable 1945 period.



Scale model of International Minerals & Chemical Corporation's new recovery plant under construction at Noralyn, Florida. The plant will have an annual capacity of 1,000,000 tons and will incorporate design innovations which are expected to bring about the highest recovery rate ever attained.

Potash Before the war about half the potash consumed in the United States was imported from Germany. The discovery of important deposits in New Mexico and California, combined with improved mining and production methods, has increased output sufficiently to meet domestic demands. Production in 1945 amounted to 1,588,305 short tons of potassium salts containing 874,243 tons of equivalent potash. About 90 percent of home production was used for agricultural purposes to bring about a much-needed 25 percent increase in crops.

Bentonite Showing an increase for the seventh consecutive year, the output of bentonite in 1945 was 5 percent over the 1944 figure, and approximately three times greater than the production in 1938. The major markets for this material are in the foundry and petroleum industries. Almost 66 percent of the output in 1945 came from the Wyoming - South Dakota area.

Bauxite The output of crude bauxite in 1945 has been estimated at 1,146,785 long tons, a drop of over 65 percent from 1944. This sharp decline resulted from the greatly reduced demand in alumina production, the use of ore from

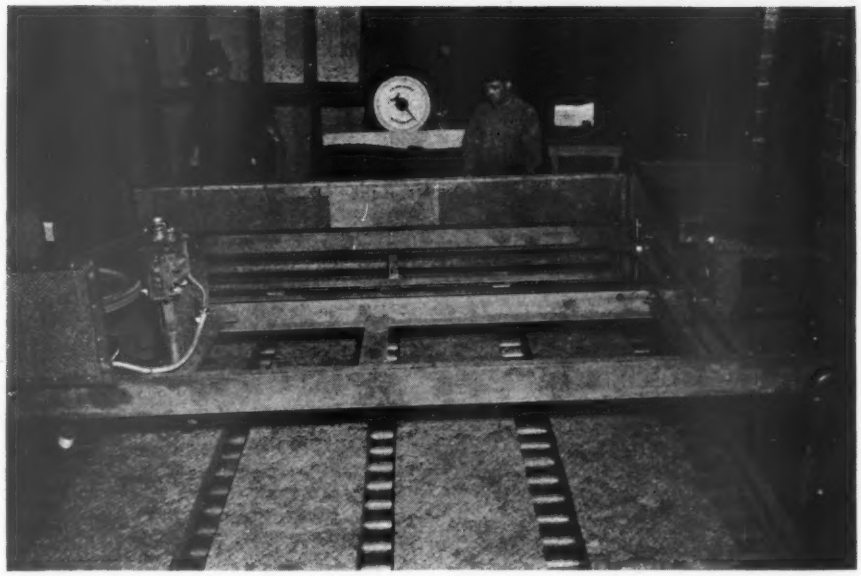
stockpiles and an excess of imports over exports. This downward trend was reversed in the second quarter of 1946, when crude output of 303,-163 long tons showed a 29 percent increase over the first quarter. The significant fact was that the tonnage mined in the second quarter was greater than in any quarter prior to 1941, when the war demand for alumina created an unprecedented demand for crude bauxite.

Asbestos Domestic output of raw asbestos, consisting of the shorter grades of chrysolite mined in Vermont, amounted to 13,605 short tons, an increase of 80 percent over the 1944 figure of 7,558 short tons. The domestic industry, however, produced only 3 percent of the asbestos consumed in the United States, the preponderant share being imported from the Thetford Mines area of Quebec Province Canada. A new mining and milling property got into production at Thetford Mines in June, 1946. It is Flintkoe Mines, Ltd., a Canadian subsidiary of the American-owned Flintkote Company. About 60 percent of the world's supply of asbestos fibers is mined in Quebec Province.

Crude Magnesite Although production of 336,-458 tons of crude magnesite in 1945 showed a 40 percent drop from 1944, it was still high compared with the 1937 to 1939 average of 166,000 tons. Main reason for the sharp drop was the closing of the Basic Magnesium flotation plant at Gabbs, Nevada, which provided the raw material for magnesium metal production during 1943 and 1944. Caustic-calcined magnesia accounted for most of the drop in sales. Sales of refractory magnesia during 1945 amounted to 254,994 tons, a drop of only 8½ percent from the preceding year.

Fuller's Earth Sales amounting to 296,368 tons of Fuller's earth in 1945 marked a slight increase over the 1944 level of 294,737 tons. There were increases in all major uses with the exception of rotary drilling mud. The Georgia-Florida district produced 45 percent of the output, and Texas ran a close second with 35 percent of the total.

Fluorspar Production of approximately 367,000 tons of fluorspar in 1945 marked an 11 percent drop from the preceding year. Illinois and Kentucky ranked first and second with output of 147,251 and 95,142 tons. Figures were not available for 1946 production, but a small increase in tonnage of all grades seemed indicated. With capacity operations in steel almost assured for 1947, and construction volume certain to increase during the year, the outlook for the industry is extremely bright.



Several new rock wool plants were able to get into production during 1946, but there was still a large backlog of unfilled orders. Demand was particularly high for batts. View above shows the cutting table in the new batt plant of Gypsum, Lime & Alabastine at Caledonia, Ontario.

Salt Although output of salt in 1945 was down 2 percent from the preceding year, it was still higher than in any year prior to 1944. Producers reported sales of 15,394,141 short tons with a value of $46,069,064.

Latin American Review

(*From page* 114)

The plant will be a wet-process operation with a daily capacity of 4,000 bbl. It is being designed for flexibility to make possible the production of various types of cement, and for a minimum of man power. The two 9½- by 375-ft. kilns will be equipped with chains, Fuller coolers and all modern control equipment. The grinding departments will be located in the same building to save labor. Raw materials will be crushed to ½ in. minus before going to the mills. Wet raw grinding will be done with rake and bowl classifiers in a two-stage closed circuit. The limestone and clay slurries will be stored separately to provide for maximum flexibility in blending. Each clinker mill will have three feeders, so that masonry cement can be made. These mills will also be in closed circuit with air separators and Fuller-Kinyon pumps will convey the finished product to storage. The storage and packing plants will be of entirely new design which it is said will have many advantages over present types.

National So that new building will not be hampered, the Venezuelan government recently set up the National Cement Co. with a capital of $1,250,000, to build cement plants in strategic locations. Two new plants, at Maracaibo and Barquismeto, are said to be nearly ready to produce.

Peru

Current projects under way in the nonmetallic mineral industries of Peru include a new cement plant under construction in Arequipa and another proposed for the vicinity of Lima.

Colombia

A new portland cement plant is being built in Colombia which will have two 10- by 240-ft. Allis-Chalmers rotary kilns, equipped with chains, and two 4½- by 70-ft. air-quenching clinker coolers.

Ecuador

In Ecuador cement production, although held back by fuel and other shortages, has shown an upward trend which has made possible the resumption of exports to Colombia and Peru. The demand in Ecuador actually decreased in 1945 because of transportation difficulties and the almost complete cessation of private construction in the coastal zone.

Plans are said to be under way for the construction of a new cement plant near Riobama, Ecuador. The plant would have a capacity of

(*Continued on page* 136)

NECROLOGY

During 1946 a number of men well known in the non-metallic minerals industries and related fields, many of them in active service, were taken by death. Readers will find among the following obituaries the names of persons long familiar to them in the roster of American producers:

DAVID ADAMS, 64, former engineer, Lawrence Portland Cement Co., Northampton, Pa.; active in National Safety Council work.

EDMUND D. BARRY, former manager of industrial relations, Universal Atlas Cement Co. (New York City), which he joined in 1903; appointed operating manager at Chicago in 1930.

JOHN A. BLANK, consulting engineer, Cementos Atoyac, S. A., Puebla, Puebla, and Cementos Veracruz, S. A., Orizaba, Veracruz, in an automobile collision; formerly affiliated with Phoenix Cement Co., Nazareth, Pa., and Lehigh Portland Cement Co., Newcastle, Pa.

HAROLD C. BOSWELL, 49, vice-president, Ready Mix Concrete Co., Sioux City, Ia.; formerly associated with L. G. Everist, Inc., Sioux Falls, S. D.

DOUGLAS L. BOYER, 55, sales manager, Phosphate Division, Monsanto Chemical Co., St. Louis, Mo., a victim of the Hotel LaSalle fire in Chicago.

F. E. BRECKINRIDGE, 44, president, F. E. Breckinridge Materials Co., Webster Groves, Mo.

SAMUEL P. BURNAM, 58, president, Kentucky Stone Co., Louisville, Ky.

HERBERT W. CALDWELL, 79, former president, Cleveland Quarries Co., Cleveland, O.; affiliated with the firm for 50 years.

CHARLES F. CONN, 80, for 37 years president, Giant Portland Cement Co., Philadelphia.

BURRITT A. CUSHMAN, 80, former president, Bedford Hills Concrete Products Co., Bedford Hills, N. Y.

FRANK E. DAVIS, 59, secretary-treasurer since 1929, National Gypsum Co., Buffalo, N.Y.

VINCENT G. DODDS, 50, president, Sierra Talc Co., Los Angeles, from injuries received in an automobile accident; formerly associated with Aluminum Co. of America.

JOHN DOMHOFF, 78, president, Domhoff Burial Vault Co., East St. Louis, Ill.; pioneer manufacturer of this product.

HAROLD DRAKE, 50, purchasing director, National Gypsum Co., Buffalo, N.Y., for 20 years.

J. STEWART ELWELL, director and sales manager, Western Lime and Cement Co., Milwaukee, Wis.

HORACE T. FERRON, 47, proprietor of a cinder block plant at Charlottesville, Va., in an automobile accident.

CARL FIELD, 56, founder and president, Northwest Talc and Magnesium Co., Clear Lake, Wash.

HEMMING I. FRANZ, 43, general superintendent, Eastern Magnesia Talc Co., Waterbury, Vt.

FRANK L. GAUTIER, vice-president, Consolidated Rock Products Co., Los Angeles; pioneer sand-and-gravel producer in Los Angeles area.

WILLIAM A. GODSHALL, 50, director and vice-president, Blue Diamond Corp., Los Angeles.

ARTHUR R. HALEY, general manager, Pittsburgh Plate Glass Company's Columbia Cement Division, Zanesville, O.; formerly president and general manager, J. P. Loomis Coal and Supply Co., Akron, O.

A. ACTON HALL JR., 41, president, Piqua Stone Products Co., Piqua, O.

O. C. HART, chief chemist, Monolith Portland Cement Co., Los Angeles.

JOHN H. HEFFERNAN, 80, former owner and president, Glacier Gravel Co., Seattle, Wash.

EARL R. HUTCHINS, superintendent, Thornton (Ill.) plant of Marblehead Lime Co., Chicago.

GORDON HUGHES, 50, sales manager and director, Inland Lime & Stone Co., Manistique, Mich., as the result of a motor accident; formerly associated with the White Marble Lime & Stone Co. (absorbed, 1928, by Inland) and Hillside Fluorspar Mines, Rosiclare, Ill.; director, National Lime Association.

C. R. JACKSON, chief chemist, Arkansas Portland Cement Company's plant at Okay, Ark.

JOSEPH H. JACKSON, vice-president and general manager, Carbon Limestone Co., Youngstown, O.; affiliated with Carbon Limestone since 1918.

GUY W. JORDAN, chief chemist, Southern States Portland Cement Co., Rockmart, Ga., as the result of an accident; formerly associated with Calaveras Cement Co., San Francisco.

J. E. JUBAN, 55, president, Ross Gravel Co. and Juban Sand and Gravel Co., Shreveport, La.

E. J. KRAUSE, 75, president, Columbia Quarry Co., St. Louis, Mo., from 1906 to the time of his death; former president, National Crushed Stone Association, Midwest Agricultural Limestone Institute; member of board of directors, Agricultural Limestone Division, N.C.S.A.

ALVIN U. LONG, 74, former general superintendent, Marblehead Lime Company's plant at Quincy, Ill.

OSCAR LOTZ, 45, owner and operator, Carl Lotz Sand and Gravel Co., Wausau, Wis.

JAMES H. MCNAMARA, treasurer, National Lime Association; organizer and president, Eagle Rock Lime Co., Eagle Rock, Va.

HENRY MCSWEENEY, 91, president, United States Potash Co., Carlsbad, N.M.; head of firm since 1925.

CONRAD C. MILLER, 50, purchasing agent, Pennsylvania-Dixie Cement Corp., 1917 to 1945; son of John A. Miller Sr., founder of Penn.-Dixie.

SIR ARCHIBALD MITCHELSON, 67, a founder of Alpha Cement Co., of England; chairman of 18 industrial companies.

ERIC J. OCHS, superintendent, Green Bag Cement Co. of Pennsylvania, Pittsburgh, Pa., 1925-1939.

ALBERT E. O'NEIL, 57, for 27 years secretary-treasurer, Aetna Portland Cement Co., Bay City, Mich.

JOSEPH M. PUSEY, 66, general manager, Wilmington Division, Warner Co., Philadelphia; founder, Edward R. Pusey Co., later merged with Warner Co.

REUBEN P. REED, 52, sales manager, Big Rock Stone and Material Co., Little Rock, Ark.

CHARLES P. REIDY, 66, retired chief electrical and steam engineer, Universal Atlas Cement Co., Allentown, Pa.

FRANK E. RISTINE, 79, former superintendent, Limestone (Wash.) plant of Olympic Portland Cement Co., Ltd., Seattle, Wash.

LEWIS H. ROTHRAUFF, 60, owner and operator, Spring Sand and Stone Co., Sinking Spring, Pa.

FRANK RUPRECHT, 85, president and founder, Ruprecht Building Materials Co., St. Louis, Mo.

JOHN L. SENIOR, 67, chairman of board of directors, Consolidated Cement Corp.; president, Florida Portland Cement Co., Signal Mountain Portland Cement Co., Trinity Portland Cement Co., Cowham Engineering Co.; former president, Peninsular Portland Cement Co. and Consolidated Cement Corp.; former member, executive committee and board of directors, Portland Cement Association.

SAMUEL M. SHALLCROSS, 53, industrial consultant; former general manager, Warner Co. interests at Bellefonte, Pa.; vice-president and treasurer, Walton Laboratories, Irvington, N.J.

ALBERT L. SHEFFER, 73, president, Bloomsburg Sand and Gravel Co., Bloomsburg, Pa.

EDMUND A. SMITH, 47, general manager, Cinder Concrete Products, Inc., Kansas City, Mo.

CHRISTOPHER STEADMAN, 72, civil engineer and manager, American Brick Co.; formerly associated with Massachusetts Broken Stone Co., Boston; built first official highway in the United States.

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Highway Forecast

(*From page* 99)

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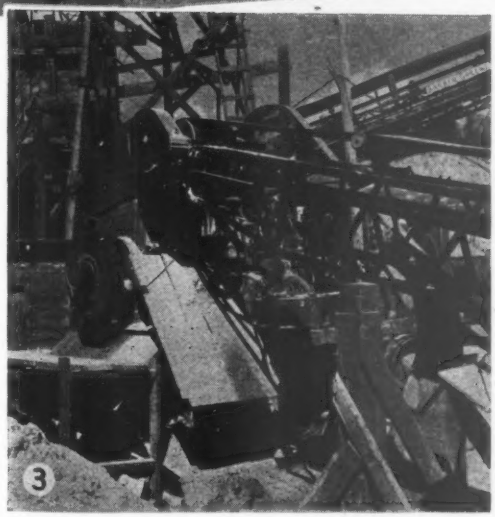

NECROLOGY

During 1946 a number of men well known in the non-metallic minerals industries and related fields, many of them in active service, were taken by death. Readers will find among the following obituaries the names of persons long familiar to them in the roster of American producers:

DAVID ADAMS, 64, former engineer, Lawrence Portland Cement Co., Northampton, Pa.; active in National Safety Council work.

EDMUND D. BARRY, former manager of industrial relations, Universal Atlas Cement Co. (New York City), which he joined in 1903; appointed operating manager at Chicago in 1930.

JOHN A. BLANK, consulting engineer, Cementos Atoyac, S. A., Puebla, Puebla, and Cementos Veracruz, S. A., Orizaba, Veracruz, in an automobile collision; formerly affiliated with Phoenix Cement Co., Nazareth, Pa., and Lehigh Portland Cement Co., Newcastle, Pa.

HAROLD C. BOSWELL, 49, vice-president, Ready Mix Concrete Co., Sioux City, Ia.; formerly associated with L. G. Everist, Inc., Sioux Falls, S. D.

DOUGLAS L. BOYER, 55, sales manager, Phosphate Division, Monsanto Chemical Co., St. Louis, Mo., a victim of the Hotel LaSalle fire in Chicago.

F. E. BRECKINRIDGE, 44, president, F. E. Breckinridge Materials Co., Webster Groves, Mo.

SAMUEL P. BURNAM, 58, president, Kentucky Stone Co., Louisville, Ky.

HERBERT W. CALDWELL, 79, former president, Cleveland Quarries Co., Cleveland, O.; affiliated with the firm for 50 years.

CHARLES F. CONN, 80, for 37 years president, Giant Portland Cement Co., Philadelphia.

BURRITT A. CUSHMAN, 80, former president, Bedford Hills Concrete Products Co., Bedford Hills, N. Y.

FRANK E. DAVIS, 59, secretary-treasurer since 1929, National Gypsum Co., Buffalo, N.Y.

VINCENT G. DODDS, 50, president, Sierra Talc Co., Los Angeles, from injuries received in an automobile accident; formerly associated with Aluminum Co. of America.

JOHN DOMHOFF, 78, president, Domhoff Burial Vault Co., East St. Louis, Ill.; pioneer manufacturer of this product.

HAROLD DRAKE, 50, purchasing director, National Gypsum Co., Buffalo, N.Y., for 20 years.

J. STEWART ELWELL, director and sales manager, Western Lime and Cement Co., Milwaukee, Wis.

HORACE T. FERRON, 47, proprietor of a cinder block plant at Charlottesville, Va., in an automobile accident.

CARL FIELD, 56, founder and president, Northwest Talc and Magnesium Co., Clear Lake, Wash.

HEMMING I. FRANZ, 43, general superintendent, Eastern Magnesia Talc Co., Waterbury, Vt.

FRANK L. GAUTIER, vice-president, Consolidated Rock Products Co., Los Angeles; pioneer sand-and-gravel producer in Los Angeles area.

WILLIAM A. GODSHALL, 50, director and vice-president, Blue Diamond Corp., Los Angeles.

ARTHUR R. HALEY, general manager, Pittsburgh Plate Glass Company's Columbia Cement Division, Zanesville, O.; formerly president and general manager, J. P. Loomis Coal and Supply Co., Akron, O.

A. ACTON HALL JR., 41, president, Piqua Stone Products Co., Piqua, O.

O. C. HART, chief chemist, Monolith Portland Cement Co., Los Angeles.

JOHN H. HEFFERNAN, 80, former owner and president, Glacier Gravel Co., Seattle, Wash.

EARL R. HUTCHINS, superintendent, Thornton (Ill.) plant of Marblehead Lime Co., Chicago.

GORDON HUGHES, 50, sales manager and director, Inland Lime & Stone Co., Manistique, Mich., as the result of a motor accident; formerly associated with the White Marble Lime & Stone Co. (absorbed, 1928, by Inland) and Hillside Fluorspar Mines, Rosiclare, Ill.; director, National Lime Association.

C. R. JACKSON, chief chemist, Arkansas Portland Cement Company's plant at Okay, Ark.

JOSEPH H. JACKSON, vice-president and general manager, Carbon Limestone Co., Youngstown, O.; affiliated with Carbon Limestone since 1918.

GUY W. JORDAN, chief chemist, Southern States Portland Cement Co., Rockmart, Ga., as the result of an accident; formerly associated with Calaveras Cement Co., San Francisco.

J. E. JUBAN, 55, president, Ross Gravel Co. and Juban Sand and Gravel Co., Shreveport, La.

E. J. KRAUSE, 75, president, Columbia Quarry Co., St. Louis, Mo., from 1906 to the time of his death; former president, National Crushed Stone Association, Midwest Agricultural Limestone Institute; member of board of directors, Agricultural Limestone Division, N.C.S.A.

ALVIN U. LONG, 74, former general superintendent, Marblehead Lime Company's plant at Quincy, Ill.

OSCAR LOTZ, 45, owner and operator, Carl Lotz Sand and Gravel Co., Wausau, Wis.

JAMES H. MCNAMARA, treasurer, National Lime Association; organizer and president, Eagle Rock Lime Co., Eagle Rock, Va.

HENRY MCSWEENEY, 91, president, United States Potash Co., Carlsbad, N.M.; head of firm since 1925.

CONRAD C. MILLER, 50, purchasing agent, Pennsylvania-Dixie Cement Corp., 1917 to 1945; son of John A. Miller Sr., founder of Penn.-Dixie.

SIR ARCHIBALD MITCHELSON, 67, a founder of Alpha Cement Co., of England; chairman of 18 industrial companies.

ERIC J. OCHS, superintendent, Green Bag Cement Co. of Pennsylvania, Pittsburgh, Pa., 1925-1939.

ALBERT E. O'NEIL, 57, for 27 years secretary-treasurer, Aetna Portland Cement Co., Bay City, Mich.

JOSEPH M. PUSEY, 66, general manager, Wilmington Division, Warner Co., Philadelphia; founder, Edward R. Pusey Co., later merged with Warner Co.

REUBEN P. REED, 52, sales manager, Big Rock Stone and Material Co., Little Rock, Ark.

CHARLES P. REIDY, 66, retired chief electrical and steam engineer, Universal Atlas Cement Co., Allentown, Pa.

FRANK E. RISTINE, 79, former superintendent, Limestone (Wash.) plant of Olympic Portland Cement Co., Ltd., Seattle, Wash.

LEWIS H. ROTHRAUFF, 60, owner and operator, Spring Sand and Stone Co., Sinking Spring, Pa.

FRANK RUPRECHT, 85, president and founder, Ruprecht Building Materials Co., St. Louis, Mo.

JOHN L. SENIOR, 67, chairman of board of directors, Consolidated Cement Corp.; president, Florida Portland Cement Co., Signal Mountain Portland Cement Co., Trinity Portland Cement Co., Cowham Engineering Co.; former president, Peninsular Portland Cement Co. and Consolidated Cement Corp.; former member, executive committee and board of directors, Portland Cement Association.

SAMUEL M. SHALLCROSS, 53, industrial consultant; former general manager, Warner Co. interests at Bellefonte, Pa.; vice-president and treasurer, Walton Laboratories, Irvington, N.J.

ALBERT L. SHEFFER, 73, president, Bloomsburg Sand and Gravel Co., Bloomsburg, Pa.

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CALIFORNIA'S SWELLING POPULATION BOOMS BUILDING MATERIALS INDUSTRIES

CALIFORNIA continues to be on the receiving end of the greatest movement of population in history. The hordes which came westward during the war to build ships and planes liked the country so well they confounded all predictions by remaining, thousands more pouring in daily since the war ended. As a result, California's population today is 50 percent greater than it was before the war. Biggest clamor of all, of course, is for housing; and the sand, gravel and allied industries have been at their wit's end to take care of this unprecedented demand. Small concrete-block plants have mushroomed by the hundreds, eager to supply masonry materials as a substitute for the extremely scarce lumber, many of these never even getting into production, because of the scarcity of cement, and even pea gravel and sand.

Activity is heaviest in the Los Angeles section, with the San Francisco area running a close second. Plants in the Los Angeles metropolitan area produced and delivered a record 10,000,000 tons of sand and gravel in 1946, the monthly peak having been reached in October when more than 1,000,000 tons was shipped. With controls off construction and a tremendous highway program in the offing, the future outlook is even more promising. This record output, with one or two exceptions, was attained with little new-plant construction. The only important new aggregates plant to begin production in the area was that of the Azusa Rock & Sand Co. The Granite Materials Co. has a new 250-t.p.h. operation under construction in the Roscoe area of the San Fernando Valley, slated to go into production in the late spring of 1947, while most of the other producers, notably Consolidated Rock Products Co., John D. Gregg, and the Arrow Rock Co., made improvements which stepped up operating efficiency and increased production capacity to handle the demand.

Practically all the aggregates produced in Los Angeles County are moved by trucks and truck-trailers and an important development in January, 1947, was the placing in service by John D. Gregg of the first few units of a fleet of behemoth high-speed delivery trucks, each of which carries 25 tons payload! These huge custom-built units use butane to power their 350-hp. engines.

• A construction view of the new 250-t.p.h. aggregates plant of the Granite Materials Company, North Hollywood, Calif., as it appeared late in December, 1946. It will go into service in the Spring of 1947.

The San Francisco Bay region's leading producer, Pacific Coast Aggregates, Inc., is well underway on its $3,000,000 plant-expansion program. New high-capacity sand-and-gravel plants are under construction at Eliot (800 t.p.h.) and at Kerlinger, just south of Tracy (500 t.p.h.). Also well along are two huge and almost identical distribution- transit-mix plants in Oakland and Sacramento. Smaller batching plants have already been completed at San Jose, Niles, and Palo Alto.

Plant-improvement programs in the cement, gypsum, ready-mix and concrete products industries in California are referred to in review-by-industry articles on other pages of this issue. Worthy of mention here, however, is the new plant of Wailes-Bageman Co. at Los Angeles, destined to be one of the largest concrete-products plants in existence when its six Besser Supervibrapacs are installed and operating. Production is already under way with two machines in service. Flexicore and other types of concrete joists are also to be produced on a large scale.

Latin American Review

(*From page* 133)

about 200 tons daily and would cost over $750,000. Production of cement in Ecuador rose from 1,785 short tons in 1942 to about 42,000 tons in 1945 but this is said to be far short of needs. Three-fourths of the imports have come from the United States and the balance from Great Britain.

Panama

Cemento Panama Cemento Panama, formed by a group of public - spirited citizens, is building a new wet-process cement plant on the Quebrancha River which is expected to meet the needs of that country, which formerly had to depend entirely on imports. This plant was designed by the Allis-Chalmers Mfg. Co. which is also supplying most of the equipment. Major equipment includes two 115-ft. diameter Dorr thickeners, a 9- by 13-ft. Allis-Chalmers ball mill, two 7½- and 10- and 7½- by 300-ft. Allis-Chalmers kilns, two 3 - by 50 - ft. Allis - Chalmers air-quenching clinker coolers and a 7- by 35-ft. three - compartment Compeb finish mill with an air separator. Power will be supplied by three Worthington diesel engines driving Allis-Chalmers 600-kw. a.-c. generators. This plant should be completed in 1947 if no further delays in delivery of equipment are experienced.

Dominican Republic

On May 15, 1944, the Dominican Government and Foundation Co. signed a contract for the immediate construction of a cement plant near Ciudad, Trujillo, Dominican Republic. By the end of the year construction was well along, and completion was expected some time in 1945. Total cost was estimated at $1,622,000 and productive capacity at 360,000 barrels per year. This plant will supply all domestic needs for cement and provide it for the Government (Direccion General de Obras Publicas) for contemplated concrete roads to replace present asphalt roads and wooden bridges.

Pacific Coast Aggregates, Inc., suppliers of building materials, sand, gravel, crushed rock and ready-mixed concrete, have moved their general office and warehouse to 400 Alabama St., San Francisco.

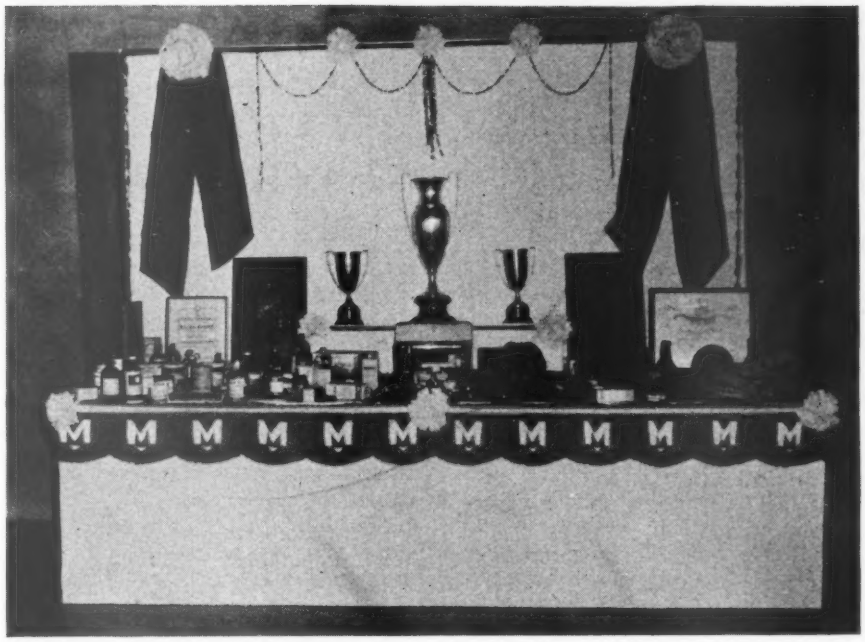
Marquette Cement Manufacturing Co. Attains Unparalled Safety Record

another ON THE SPOT report

ON the evening of December 18, 1946, the Marquette Cement Manufacturing Company held an elaborate celebration at the civic arena of Cape Girardeau, Mo., in honor of the unprecedented safety record recently established by the employees of the Marquette plant at Cape Girardeau. A buffet dinner, dancing and entertainment by eight professional acts flown from Chicago marked the program provided by the Marquette company. Among the 2,187 celebrants were all the employees of the Cape Girardeau plant, their families, 14 top executives of the company and several score distinguished guests.

Following the dinner of baked ham, barbecued beef, barbecued pork and the side dishes of palatable delicacies, a period of community singing was brought to a close by the singing of the National Anthem, and the invocation.

Anderson Hayden, plant safety engineer, gave a brief address of welcome before introducing L. G. Dudeck, field engineer for the Portland Cement Association, and J. H. Howe, superintendent of the Cape Girardeau plant. In behalf of all the Marquette employees, Mr. Howe accepted a special certificate award, presented by Mr. Dudeck in behalf of the P. C. A. This certificate award was in recognition of 2,000 consecutive days of operation without a lost-time accident, or over 3,600,000 consecutive man-hours of accident-free operation. This unequalled safety record in the cement industry was established over the period from June 20, 1941, to December 12, 1946.



Display of safety awards for previous records in safety set by the Cape Girardeau plant. First-aid and safety equipment also exhibited.

By Floyd C. Leverette

This certificate will be added to the many other awards for safety achievement bestowed upon the Cape Girardeau plant. Former trophies include the following: the monumental Portland Cement Association award and re-awards for 12 of the last 17 years; the National Safety Council's "Award of Honor for Distinguished Service to Safety," presented last year for operating in excess of two million consecutive man-hours without a disabling injury; the *Explosive Engineer's* bronze plaque for the years 1928, 1929, 1930 and 1944; and the Joseph A. Holmes "Special Award for Quarry Safety."

In making the formal presentation, Mr. Dudeck heralded the Marquette record as a challenge to all industrial groups everywhere and cited it as the best example of united employee action.

Clyde D. Harris, president of the Cape Girardeau Chamber of Commerce, stressed the importance of the Marquette company and its employees in the civic welfare of the community. Further amplification

(*Continued on page* 138)

Left: Among the officials of the Marquette Cement Manufacturing Company attending the company's big safety celebration at Cape Girardeau, Mo., were (left to right): V. A. Kogge, manager, marine division; Anderson Hayden, safety engineer, Cape Girardeau plant; R. Moyle Sr., vice president in charge of operations; W. A. Wecker, president of Marquette (shaking hands with Hayden); V. J. Hanley, secretary-treasurer; J. H. Howe, plant superintendent. Photo was taken outside the Marquette plant office at Cape Girardeau a few hours before the party.

Recommendations for Preparing Prime Bearings for Babbitting

HERE are a few timely tips taken from the *Babbitter's Manual,* issued by L. D. Staplin of Carbonite Metal Company, Ltd., of Burlington, Wis., regarding the preparation of a prime bearing. They may prove of interest to our readers, especially maintenance men concerned with the upkeep of equipment.

"If a lining works loose, oil will work into and lodge in the space between babbitt and shell. The heat conductivity of oil is about 1/200th that of metal. If it were not there, the friction heat would be allowed to pass freely through the shell and harmlessly dissipate itself. The presence of oil insulates the box, prevents this dissipation and so causes a bearing to run warmer. Also loose liners quickly crack, crumble and break—making necessary a repair job long before they are worn out."

"When a bearing requires frequent attention, check its anchorage and correct any defects it possesses. The best anchorage is the dovetail type, which is plenty wide, deep and well tapered. Shallow dovetail anchors (less than 5/16-in. deep) are almost worthless. To correct them, drill well-angled roots into their bases, to act like the roots of a tooth."

"The faster metal cools after being poured the better, as is the case with iron which is made harder, denser and tougher by placing chills into a mold. The same thing applies to babbitt metals. The slower the metal cools, the softer, more brittle, spongy and porous it will be. The job therefore is to get fast cooling of our castings. They will 'give' less as the effect of vibration, loads and shocks; thereby holding clearances better. And they will not be so prone to crack, break and crumble."

"In preparing the box for receiving the metal, prewarm it. Then everything shrinks down together more evenly while contraction of cooling is taking place and a snugger and better fit of babbitt to shell is obtained."

"When melting metal, its contact with air causes it to absorb and become sluggish in the ladle and pour poorer at any given temperature. To make it flow freely, keep oxygen out of it by keeping it covered with a thin fire of blazing charcoal. The flames give off rich CO and CO_2 gases, which being between the air and the metal, reduce its oxygen before it can get through into the babbitt."

"It is also important to stir the metal just before pouring. This is the only way to insure even texture, structure, load value and ability to resist mashing, heating, breaking and fast wear where there is abrasive material to contend with."

"If bothered with sinks—sunken areas in the casting—use risers. A 'sink' is an area which cooled faster than the adjoining area. As the metal in the faster-cooled area shrank first, liquid metal from the adjoining area flowed into the space created by that shrinkage, leaving a sunken spot in the area whence it came."

"Babbitt passes through three stages during cooling—liquid, mush and solid. It starts to shrink the instant it begins to cool. While in the mush stage, it had little or no strength, locked itself tightly through its anchorage, and shrinkage strains set themselves up in it."

"To prevent formation of cracks, watch the matter of the temperature of babbitt and mold. The cooler the babbitt, the less expanded it is when it enters the mold; hence the less it will shrink and the weaker will be the shrinkage strains. Also the faster it will pass through the mush stage, which cuts down the time and chance of cracks forming."

"Always remember while liners are cooling, allow nothing to move or jar them to the slightest extent."

The manual gives specific recommendations for bearings covering air compressors, dredging machinery, heavy-duty pumps, diesel engines, sand, gravel, brick and tile, glass and silica and cement mill equipment, as well as bearings for rock and ore crushers. Much valuable bearing information can be obtained and kept on file for future reference.

Marquette Banquet

(*From page* 137)

of the significance of the Marquette safety record was discussed by Dr. W. W. Parker, president of Missouri State College. Dr. Parker closed his brief address by congratulating management, supervision and the employees of the Marquette company for their achievement.

Walter A. Wecker, president of the Marquette company, showing pride in the record set by the Cape Girardeau employees, in his brief address paid individual tribute to the many of those participating in the achievement. Lauding the group's current records, Mr. Wecker stressed the value of continued relentless effort toward even greater goals in safety and pledged Marquette management's continued all-out cooperation to that end.

With the conclusion of Mr. Wecker's address, the next 1½ hours of the program were devoted to entertainment by the eight vaudeville acts, accompanied by a 12-piece orchestra. Following the vaudeville acts, the orchestra provided music for dancing.

In addition to W. A. Wecker, Marquette officials present, from the company's general offices in Chicago included the following: D. S. Colburn, vice-president; V. J. Hanley, secretary-treasurer; L. W. Saxby, assistant to the president; S. L. Cribari, assistant to the president; Frank Moyle, director of operations; J. C. Witt, technical director; A. F. Miller, chief engineer; V. A. Kogge, manager, marine division; George L. Kirp, operations engineer; William E. Erwin, manager of industrial relations; Jack K. White, director of public relations.

Richard Moyle Sr., Marquette vice-president in charge of operations, and his son, Ralph Moyle, superintendent of the company's plant in Oglesby, Ill., drove to Cape Girardeau from Oglesby.

Montana Phosphate

Extensive phosphate deposits owned by the government in Montana have been opened to private development by the Interior Department. The 200-acre tract is located in Silver Bow County. Interior Secretary Krug stated that the deposits would produce 2,000 tons of phosphate per year. Bids for the privilege of developing the beds were opened in November.

The Republic Chemical Corporation of New York City recently shopped for chlorinated lime at the government's surplus market and was billed $28,388 for 1,892,560 pounds of the stuff. The material was bought from the War Assets Administration; it had been stored in New Cumberland, Pa., by the army.

Drilling, blasting, crushing, screening, and electrification are only a few of the many subjects completely covered in the 23 chapters in the Pit and Quarry Handbook.

Mexican Firm Installs Inclined Furnace To Make Lime for Carbide Production

another P&Q exclusive

AMONG the large users of lime is the calcium-carbide industry, in which the tonnage consumed approaches that used by the building industry. Carbide manufacturers are important lime producers in their own right, both in this country and abroad, and they have always been receptive to new and improved methods of lime manufacture since the quality of the lime utilized is necessarily high.

A large share of the carbide demand in Mexico has been met in recent years by Carburo S. A. from its plant at Guadalajara, Jalisco. Since October 10, 1946, the lime used by this plant has ben calcined in a new Nelson No. 5 inclined furnace of the type used in this country by the Provo Lime Company at Provo, Utah (See PIT AND QUARRY, August, 1945, pp. 88-89). At present, the unit is reported to be turning out approximately 10 tons of lime per day, using 120 liters (about 30 gallons) of crude oil per ton of lime produced. As soon as a better grade of fuel oil becomes available and more efficient handling facilities are installed, the company expects to improve the fuel ratio.

The stone is shipped in by rail over the Nacional de Mexico system, coming from a quarry at Huescalapa, about 180 kilometers distant. The limestone, reported to be of average quality, is unloaded from the cars directly to the crusher, where it is broken down into pieces ranging from 1 to 4 inches in size. This product is transferred by mine cars to the feed hopper of the Nelson furnace.

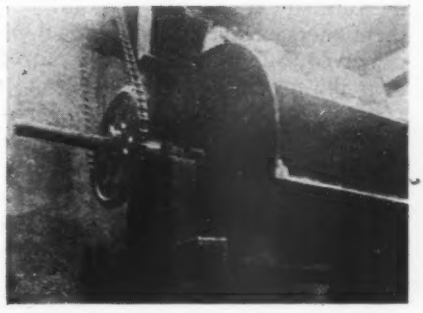
• The office and administration building of Carburo S.A. at Guadalajara, Jalisco, Mexico. Shops and plant are seen in the background.

The inclined furnace was installed on level terrain, the upper 13½ feet being above ground level and the lower 15½ feet in an excavated area below. The concrete soaking pit is below the bottom (discharge) end of the furnace at a 20-foot level below the ground. Stone is loaded into the hopper at the upper end by hand at present; likewise the finished lime product from the soaking pit. Electrically-operated lifts are on order, however, so that the handling of both stone and lime will be fully mechanized within a short time.

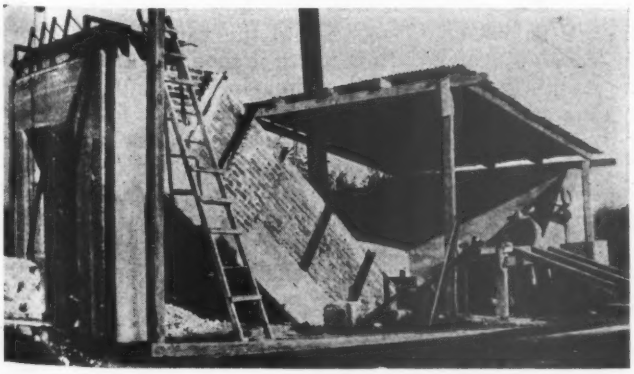
The furnace is fired with Klein burners, manufactured in Mexico and specially designed to handle the low-grade fuel oil, or "chapapote," as it is known. Atomizing of the fuel is accomplished by a special 1½-hp. motor-driven blower. Air is being used to atomize the oil instead of steam in this installation since a dry, relatively-hard lime is desired for carbide manufacture rather than a quick-slaking product which might have a tendency to "powder."

As soon as the new lifts are installed, the lime plant will be enclosed with a concrete-and-steel structure, complete with a tile roof.

(*Continued on page* 144)



• Left: Sr. Ing. Jorge de la Riva, general manager, and Sr. Ing. Fernando Leal Verdugo, assistant manager.
• Right: The discharger, where the burned lime is discharged from the furnace.
• Below, left: A view of the inclined furnace (upper portion), showing also the concrete structure around the pit, in which are located the discharger, the soaking pit and the elevator pit.
• Below, right: The blower and motor which furnish air to the burners. Directly behind the blower is the crude oil preheating and service tank.



THE LIME PLANT OPERATOR

BY WOLF G. BAUER

HYDRATION IN THEORY AND PRACTICE
Part II Reaction Phenomena

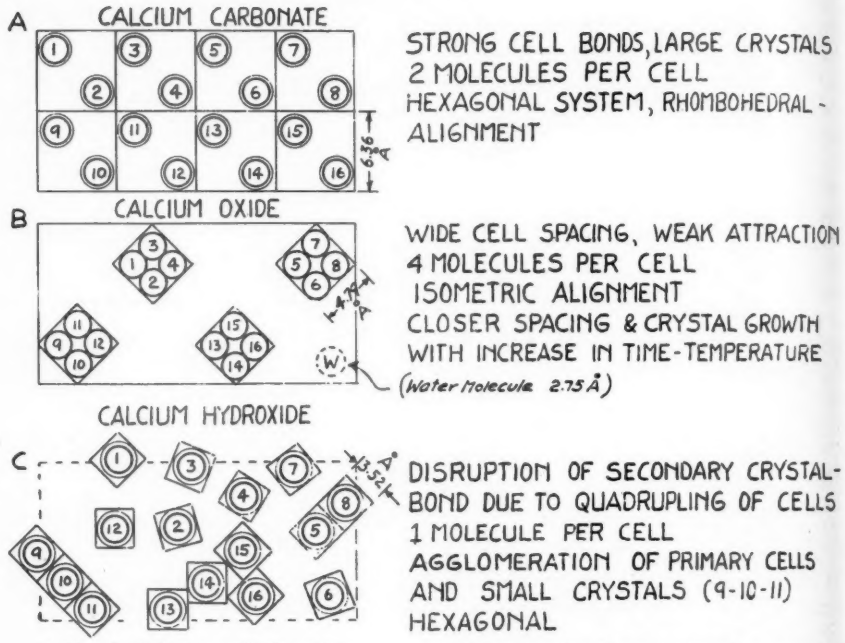
Wolf G. Bauer

IT has been the object of the last article not only to refresh our conception of matter, and how it is built up from the vibrant mass and energy of the atom to that of molecules, cells, and crystals, but also to review as well the molecular concept of the three states of matter under various heat energy conditions. Such phases of matter as electrolites, colloids, solutions, and ions will be conveniently ignored until later discussions on lime properties.

Physical Reactions In the process of lime hydration, the three states of matter—solid, liquid and gas—are all present or in the act of transformation. Hydration being both a physical and chemical reaction, we would expect considerable transformation of energies. A fundamental understanding of these energy releases and absorptions is prerequisite to exercising control over the process.

The first reaction is that of absorption. When a drop of water is dropped on a piece of lime, it disappears almost instantly as if into a sponge. If a piece of lime is wetted and held to the ear, one may hear the sound of escaping air just as one may note the bubbles of air rising rapidly from a lump of lime submerged in water. The initial phenomenon of hydration is therefore the application of capillary force, exerted on hundreds of tiny streams or fingers of water being pulled with great force into the interior of the lime particle. This force is an inverse function of the channel cross-section (film thickness).

It is obvious that a piece or particle of soft-burned lime is quite porous. This porosity is due in part to the many cleavage cracks and pockets of misalignment of the original calcite crystals whose "pseudomorphic" structure remains in the lime, and partly to the relatively wide intercellular spacing as shown in the comparative dimensional diagram Fig. 1-B. Often total pore volume is more than sufficient to accommodate the theoretical quantity of water of combination.



• Fig. 1. Relative cell dimensions.

Chemical Reactions The second hydration phenomenon is that of the initial combination of lime and water molecules along the "walls" of these main water entry channels. If the particle of lime has been exposed to vapor-carrying air for some time prior to hydration, the bouncing molecules of water vapor entering these relatively wide open spaces in the lime pores and cracks would have combined with these first layers of oxide molecules and cells, and by the disruption and division effect produced, plastered and filled up the surfaces to some extent. That this effect would inhibit and slow down the rapid dispersion of subsequent water molecules seems logical, and is more or less substantiated by the longer time for reaction of older lime.

In explanation of Fig. 1, it should be pointed out that this is not an arrangement diagram of molecules in their space lattice, but rather an attempt to clarify the interrelation of molecules and primary cells when changing from carbonate to oxide and to hydroxide. The square outlines of the primary cells merely designate the alignment forces of the cells, not their crystallographic structure. The cells are drawn in their relative dimensions. It can be seen how the numbered CaO molecules lose and take on CO_2 and H_2O molecules (outer rings) respectively, as well as how they group themselves into the various cells. From this figure it should not be too difficult to imagine the water molecules bouncing in and out of the widely-spaced oxide cells (soft-burned condition), breaking them up upon collision into four separate hydroxide cells which form crystals, cell clusters, or crystal clusters, such agglomerations acting as single particles in the hydrate mass.

Fig. 1-A shows the calcite cells in their closest alignment, forming bil-

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lions of repetitions of such cells, and which can be distinguished in many cases with the naked eye as perfect crystals. Part B hints at the difficulty of ever observing true oxide crystals in the unstable, short-lived, soft-burned lime in which these cells have not shrunk together to build up into crystalline masses. Good oxide crystals of the cubic system have been observed in lime removed from kiln linings, material which had been energized by high temperatures for sufficient lengths of time to allow shrinkage and true isometric crystal alignment of the cells into observable crystals. (Remember it would take at least 25 of these cells aligned as a single crystal before their outline could be resolved in the best magnification of the electron microscope, i.e. 100,000 X.)

Fig. 1-C shows how each primary oxide cell has been exploded into four new hydroxide cells, and which take up more space. It would not be too difficult to imagine how the effect of very high reaction temperatures (molecular vibration is equal to cell vibration in this case) can give the cells the mobility and frequency to bring them into collision and contact that would cause them to align into their closest bonding pattern of the hexagonal system. This is another way of saying that high temperatures would favor larger and more frequent crystal growth. It can easily be seen in C that the surface and water adsorption factor of three cells clustered together as 14-15-16 would be considerably larger than that of cells 9-10-11 forming a crystal, and by the same token, clusters of small crystals compared to the same mass in the form of large crystals. And so if for nothing else, Fig. 1 was drawn to help us visualize relative makeup, transformation, and dimensions of fundamental lime particles and crystals in the making.

Almost immediately after this initial reaction, the released heat increases the water vapor pressure to the point where the free vapor molecules begin to invade the line through the voids between the more or less widely spaced oxide cells. Heat is now released at greatly increased rates, and the onrushing layers of water molecules begin to break their liquid molecular bonds until at a temperature of 212 deg. F. and above, all water molecules are speeding around in the gaseous state, many times multiplying the chances and frequency of collision with calcium oxide cells. The pressure of the expanding gas (increased number of impacts of water molecules), heated by the energy released in the disruption of the valence bonds (outer electrons of the atoms), along with the expanding effect of quadrupling oxide cells into smaller hydroxide cells, all this tends to break up the lime mass into smaller and smaller particles. At this stage, the vapor and steam produced from adjoining hydration reactions of other lime particles may augment or draw away any further supply of water molecules or heat to or from the original lime piece.

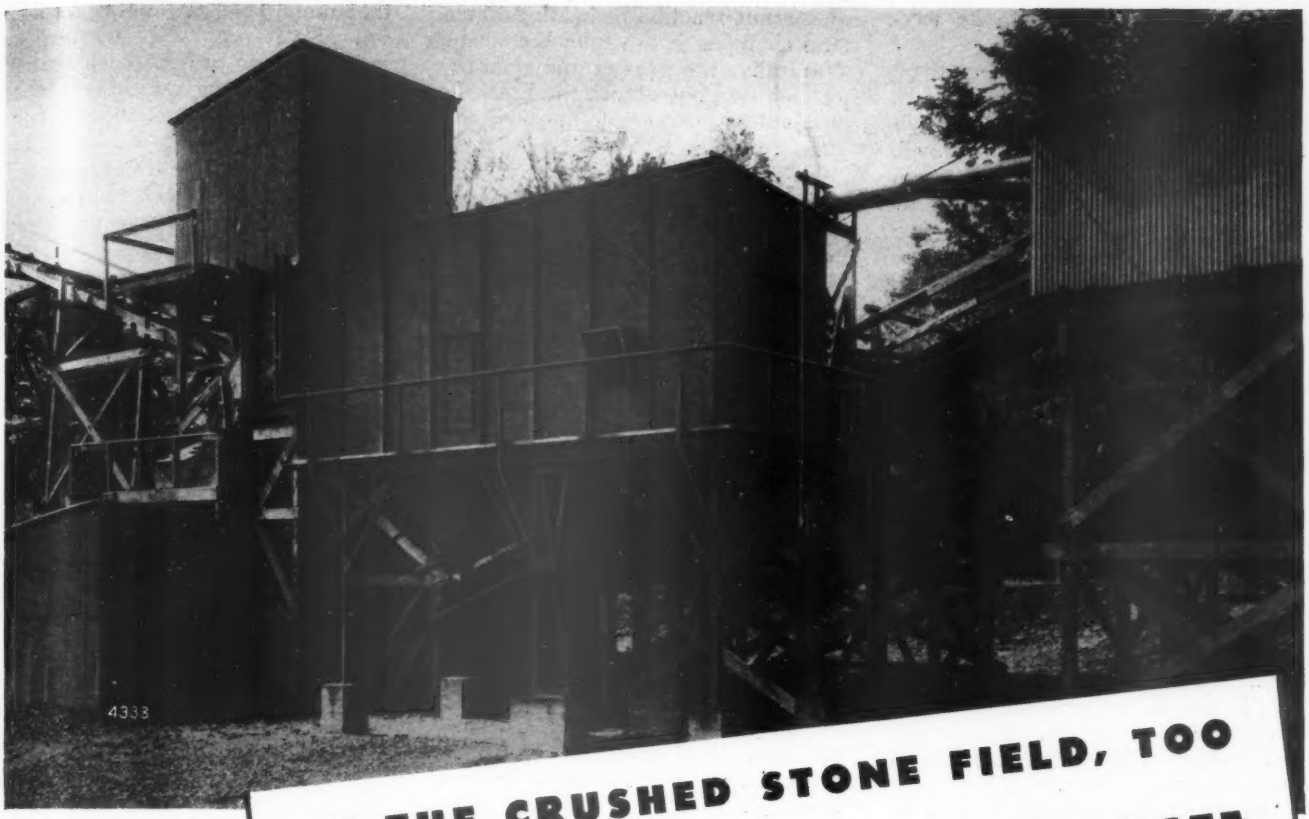
Reaction Energies In the equation $CaO + H_2O = Ca(OH)_2 +$ 15,900 cal/gram mol nearly 390 B.t.u. are released per pound of hydrate formed. In the case of $MgO + H_2O = Mg(OH)_2$, the heat is near 280 B.t.u. per pound. These heats of formation or hydration are important, as their rate of release and manner of absorption determine the temperatures prevailing in different stages of hydration, temperature in various sections of a hydrator, amount of water that can be turned to steam, length of time that must be allowed for drying moist hydrate, or for after-curing, amount of hygroscopic water that may be carried into a milling system, or the amount of insulation or cooling provisions that may be required in certain sections of a hydrating unit or system.

Hydration and re-carbonation of lime and magnesia are exothermic reactions, i.e., heat is released. It has already been pointed out that when a chemical reaction releases such energy, a compound of lower potential energy level, i.e., of greater stability, is formed. Calcium and magnesium hydroxide are therefore more stable than the oxides, reverting more or less slowly back to the carbonate or stablest form, depending on temperature and CO_2 pressure, calcium hydroxide being more active in this respect than magnesium hydroxide.

Dolomitic Lime Hydration While we are on the subject of magnesia, we might briefly compare the energy values of dolomitic and high calcium limes in relation to their effects on the liquid phase. Depending on the temperature of burning and the original porosity of the stone, a piece of high-calcium lime may absorb by capillary suction more or less water than is theoretically necessary for complete hydration (the approximate amount can be determined by using kerosene instead of water, and then reconverting weights to water equivalents). If a piece of high-calcium lime absorbs this theoretical amount, however, that would not be sufficient, because heat would be developed before all the water had combined, allowing a part of it to escape as vapor and steam.

Now it should be quite obvious that when a piece of dolomitic lime and a piece of high-calcium lime of the same weight and bulk density or porosity absorb an equal amount of water, the dolomitic lime has actually absorbed almost twice as much CaO reaction water as the piece of high-calcium lime. In other words, the capillary force in the two soft-burned pieces of lime has supplied the calcium oxide molecules in the dolomitic lime with excess cooling water. The writer feels that this, in a large measure, accounts for the astounding fact that a fresh putty made from dolomitic hydrate, containing practically no magnesium hydroxide, is nevertheless comparable more or less in plasticity and body to a similar putty made from high-calcium hydrate. No doubt the cooling effect of the extra absorbed water in the pieces of dolomitic lime oxide has produced such superior numbers, size, and shape of calcium hydroxide particles (inhibited crystal growth) that they tend to make up for the lack of help from the more or less non-plastic magnesium oxide particles which have not yet hydrated. It is later in the after-hydration of the magnesium oxide that the extra and higher plasticity of the completely hydrated dolomitic hydrate is developed.

Relative Heat Utilization Since hydration temperatures are so closely related to hydrate properties, let us look a little more closely at the release and absorption of this heat energy. The combination of .757 lb. of lime with .243 lb. of water will release about 390 B.t.u. per pound of hydrate formed. If it is assumed that a hydrator is operated with three times the weight of water theoretically necessary for hydration (a batch machine may require over four times), then for every pound of hydrate formed, ¾ lb. of excess water are available for wetting and cooling purposes. The released heat is absorbed in various ways, depending on the rate of release. In the case of very reactive lime being exposed to water in vapor or steam form, the lime may be heated to temperatures anywhere from 200 to 600 deg. F., interior temperatures in excess of 900 deg. F. having been recorded. When at a temperature between 900 and 1000 deg. F., the molecules of calcium oxide and those of water are in such an expanded and highly



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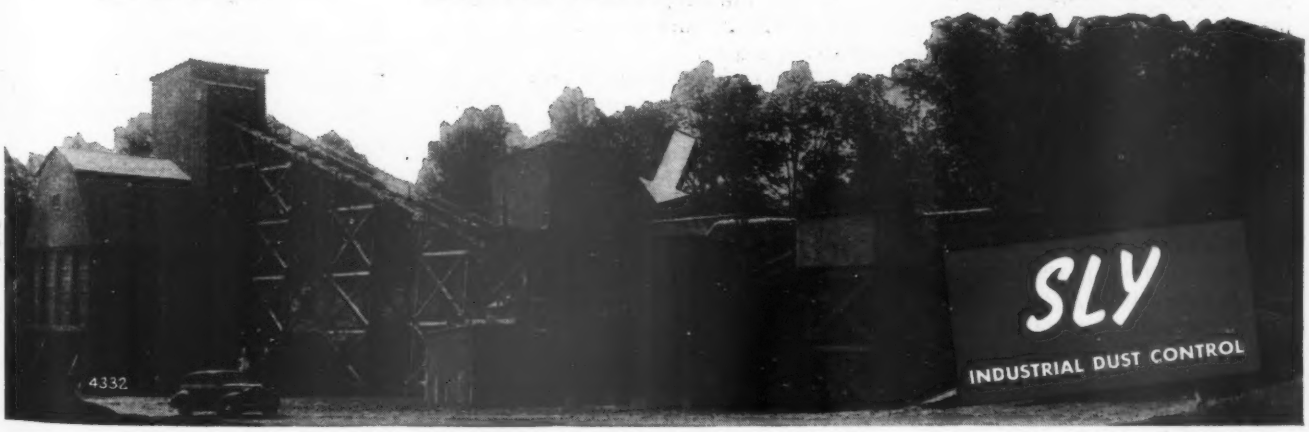

Carbide is produced in an electric vibrating state, that their valence forces are insufficient to force them into the molecular arrangement of the hydroxide cell pattern. In other words, no hydroxide can be formed. When the temperature (motion energy) of the calcium oxide molecules is slightly lowered, however, the combination probably takes place with such freedom and initial looseness of arrangement, that the cell structure becomes near perfect. This would facilitate such great and uninterrupted cell repetition that the resulting crystals of hydroxide would be free to grow to large size. That this adversely influences plasticity, for example, has been shown many times.

Why can soft-burned lime reach such high temperatures with steam or vapor? To answer that, we need only to consider the fact that it takes about five times as much heat to change water from a liquid to a gas at 212 deg. F., as is required to raise its temperature to that point in the liquid form. But to get back to the heat quantities removed.

In the case of extreme high temperature development within a piece of lime $.75 \times .20 \times (900 - 70) =$ 125 B.t.u. would be necessary to heat the lime to 900 deg. F., leaving $390 - 125 =$ 265 B.t.u. to be lost or dissipated by radiation, conduction, and convection. However, up to reaching its highest temperature, heat is lost by the particle of lime at an increasing rate, and some of the 265 B.t.u. are lost before this temperature is reached. If conditions of hydration in steam are such that dehydration temperatures are reached, further reaction and heat generation can only continue when the heat-loss rate of the piece of lime exceeds that being generated.

On the other hand, how is this temperature affected if most of the water molecules are still in the liquid state at the instant of reaction? Knowing that lime can be combined with excess water (drowning) to form hydroxide without an apparent intermediate phase change of the water molecules to gas, it may be assumed that in dry hydration no vapor phase of water is actually required. This does not presuppose, however, that no vapor phase exists, for as soon as the first water molecules combine with the oxide, the released heat increases the temperature of the surrounding yet uncombined water, vaporizing it at correspondingly increasing rates. The 390 B.t.u., instead of having raised the temperature of the lime only, have now been partly absorbed by the endothermic reaction of heating water, and changing it to vapor and steam. Naturally, the greater the quantity of such water to absorb the heat, the less will be left to raise the temperature of the lime.

So far we have viewed the process of evaporation and heating only from a uniform-theoretical side, actually, some water is vaporized at comparatively low temperatures, while some water near the hottest reaction spots may not only be turned to steam, but the steam superheated considerably. It is therefore difficult to construct a reaction diagram or heat balance. The old heating problem which we discussed in calcination confronts us again: namely, high and low level heat, and the work it can accomplish.

The available B.t.u. in the system .757 lb. lime + .243 lb. water + .486 lb. excess water may be used up in several ways, so we shall assume certain conditions in order to follow through on a probable heat balance for purposes of visualizing heat distribution in a system using three times the theoretical water (dry hydration).

Assuming that the lime is high calcium and very reactive, that our piece or pieces are surrounded by others which are also generating heat (which means low heat loss), it should further be assumed that the lime is porous and absorbs and adsorbs this total quantity of water. The maximum temperature of the lime will reach 370 deg. F. Under these conditions, it will take $1 \times 300 \times .2 = 60$ B.t.u. to heat the lime; $.486 \times 1 \times (212 - 70) =$ 74 B.t.u. to heat excess water to boiling, leaving $390 - (60 + 70) = 256$ B.t.u. for vaporization and superheating steam. Since it would require 236 B.t.u. to turn half of this excess water to steam at 212 deg. F., and we assume the extra 20 B.t.u. lost to the surroundings, we end up with .243 lb. of water at the boiling point, .243 lb. of steam at 212 deg. F., and 1 lb. of hydrate at 300 deg. F. (not the temperature measured by a measuring unit stuck into the lime-steam mass).

Although the above is only a hypothetical case, in designing a hydration unit, we may obtain temperature, moisture, pressure, and humidity readings in various existing systems that will allow the determination of cooling and drying air (to lower water vapor pressure), as well as rate of heat losses, time, and travel factors to be incorporated with a fair degree of accuracy in new type units. Despite all this, however, we may have come to the realization by now that the crux of the matter seems to rest almost wholly in whether we can supply or provide each particle of lime with the necessary cooling water in liquid form. Some of the obvious shortcomings of some of our present hydrators, in this respect, will be discussed in the next issue.

(To be continued)

Mexican Firm

(From page 139)

Carbide is produced in an electric oven which has a capacity of 12 tons in 24 hours. Power is purchased from Nueva Cia. Electrica de Chapola. Coal and coke are shipped

• Left to right: Ruben N. Nelson and his assistant, Sr. Ricardo Canales A.

in by rail from Sonora and Nueva Rosita.

The plant in its entirety uses 29 Westinghouse motors, ranging in size from ½ to 50 hp. Much of the crushing and screening equipment was supplied by Allis-Chalmers; several Rotex vibrating-shaker screens are used to classify the carbide ingredients. Other equipment includes Link-Belt elevators, Peerless pumps, and Fairbanks automatic scales.

The new No. 5 inclined furnace was installed, and its initial operation supervised, by Ruben N. Nelson of the Victor J. Nelson Engineering & Construction Co., Burbank, Calif., designer and builder.

Carburo S.A. is presently employing 115 persons in its plant and offices. Sr. Ing. Jorge de la Riva is general manager, Fernando Leal Verdugo is assistant manager, and Gilberto Anguino is the office manager.

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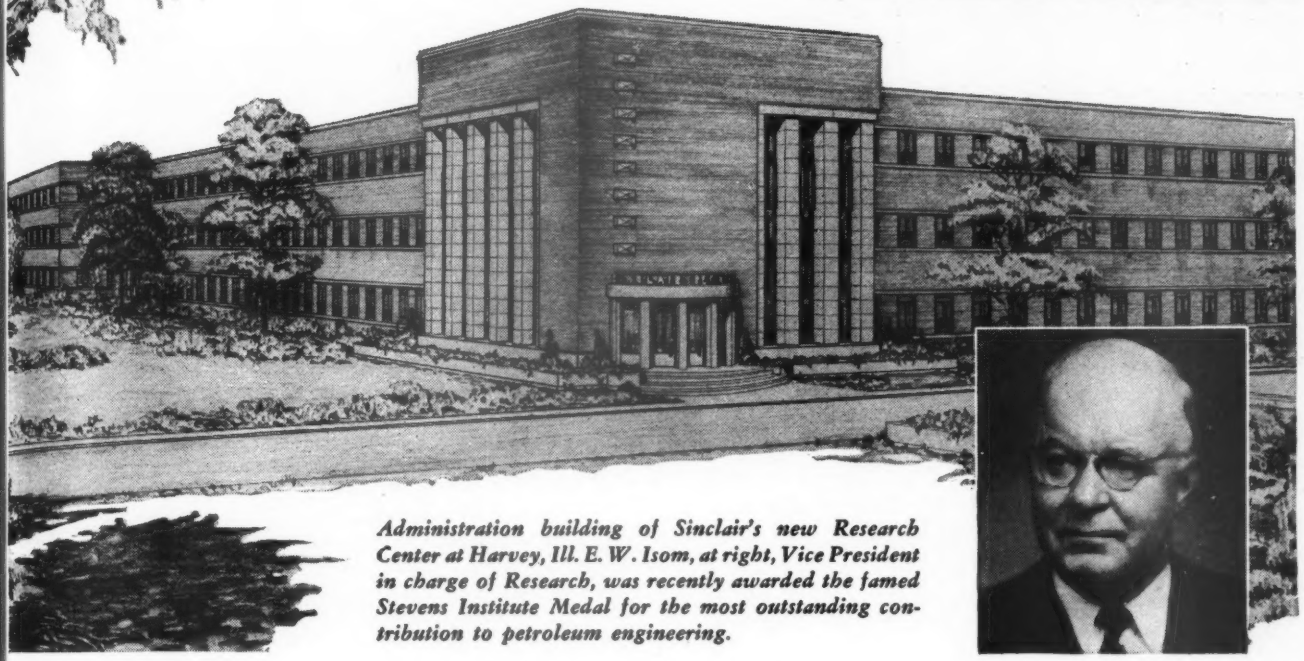

Administration building of Sinclair's new Research Center at Harvey, Ill. E. W. Isom, at right, Vice President in charge of Research, was recently awarded the famed Stevens Institute Medal for the most outstanding contribution to petroleum engineering.

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PERSONAL MENTION

H. C. Shields

HARRY C. SHIELDS, a veteran Midwestern representative of the Marquette Cement Manufacturing Company, is now sales manager for Missouri, southern Illinois and southern Indiana, with headquarters in the firm's new sales office, which will be opened in St. Louis on January 1. The address is 1221 Locust Street, St. Louis 3, Mo. Mr. Shields had covered this territory for 16 years as a Marquette service engineer.

KENNETH HACKMANN has been named as assistant to Mr. Shields in the sales office.

T. H. Miller

THOMAS H. MILLER, who has been assistant chief of the Economics and Statistics Branch of the U. S. Bureau of Mines since January, 1945, has been named assistant director of the bureau, according to an announcement from Dr. R. R. Sayers, director of the bureau.

Mr. Miller replaces GEORGE A. LAMB, assistant director since May, 1944, who resigned in October, 1946. He has been associated with the bureau for nearly 20 years. Previously he was affiliated with the bureau's staffs at Denver and Salt Lake City.

STERLING MORTON, who has been a vice-president of the Morton Salt Company for several years has been named chairman of the board, succeeding B. W. CARRINGTON.

ERLE P. HALLIBURTON, president of Erle P. Halliburton, Inc., of Los Angeles and also president of the Halliburton Oil Well Cementing Company, Duncan, Okla., was elected president of the Oklahoma Mineral Industries Conference during the group's seventh annual meeting in Ada, November 7 to 9. Mr. Halliburton succeeds W. A. (Gus) Delaney.

In the October, 1946, issue of PIT AND QUARRY (page 61) there appeared an account of the purchase by Mr. Halliburton's Los Angeles firm of a $12,500,000 government-owned aluminum sintering plant at East St. Louis, Ill.

H. J. WILLIAMS, sales manager for the New Jersey Silica Sand Co. of Millville, N. J., was recently named vice-chairman of the grading and fineness committee of the American Foundrymen's Association.

Also appointed to the committee was STANTON WALKER, consulting engineer of the National Industrial Sand Association.

A. F. FRANZ has been elected vice-president in charge of operations of the Colorado Fuel and Iron Corporation, to succeed ROBERT T. DUNLAP of Buffalo, N. Y., who has resigned.

Before coming to the Wickwire Spencer Steel Division of the corporation as general superintendent of the Buffalo plant, Mr. Franz had been associated with the Allan Wood Steel Company of Conshohocken, Pa. He was made works manager of the Colorado Division in March, 1946.

MAC H. HULL, assistant to the vice-president of Universal Atlas Cement Company, Central Region at Chicago, has been appointed assistant to the vice-president of general sales at New York City, effective December 1, 1946.

HAROLD J. BERGLAND, formerly district sales manager at Chicago, has been appointed to succeed Mr. Hull as assistant to the vice-president of the Central Region.

G. S. La Forge

G. S. LAFORGE, who was superintendent of the Lehigh Portland Cement Company's plant at Union Bridge, Md., since 1918, recently retired from his duties.

He had previously served as a chemist for several cement plants in various sections of the United States and in Ontario, Canada. He was identified with engineering interests which erected important dams in the United States and in Spain.

WILLIAM A. MCWILLIAMS has been chosen chief engineer of the Delaware State Highway Department to succeed W. W. MACK, effective Jan. 1. Mr. Mack, who has been with the department for 29 years, the last 18 as chief engineer, will be retained as special consultant.

ARTHUR P. LOTHROP, who was formerly plant engineer at the Leeds, Ala., plant of the Universal Atlas Cement Company, has been appointed assistant plant manager there.

Mr. Lothrop joined the staff of the Universal Atlas operating department in 1942 as industrial engineer. Two years later he went to the Leeds plant as plant engineer.

CHARLES H. SCHLICHER, who had been associated with the Lehigh Portland Cement Company for more than 45 years, retired from active service on November 1. Mr. Schlicher was for many years chief clerk at the Lehigh mills at New Castle, Pa., and more recently in the main office at Allentown, Pa.

BURTON G. DWYRE has been appointed acting state highway engineer of the New Mexico Highway Commission. He succeeds F. G. Healy, who recently resigned. Mr. Dwyer was state highway engineer from January, 1939 to May, 1943.

Donald E. Koch

DONALD E. KOCH was recently elected vice-president of the Giant Portland Cement Company of Philadelphia, in charge of production.

Mr. Koch has been identified with the manufacture of cement since September, 1923, when he became affiliated with the Medusa Portland Cement Company's York, Pa., plant. By 1929, when Mr. Koch had become assistant chief chemist at the newly-acquired plant of the Medusa Portland Cement Company at Wampum, Pa., (formerly Crescent Portland Cement Company), he had risen in responsibility and position from sample boy to chemical analyst.

In January, 1932, he was appointed assistant chief chemist at the Standard Portland Cement Company's plant at Painesville, O., a position he held until his appointment of chief chemist of the Giant Portland Cement Company at Egypt, Pa., in October 1937. In June, 1942, Mr. Koch was made assistant superintendent of the Giant company, and in October, 1942, upon the resignation of Mr. O. D. Havard, general superintendent, he took over the duties of acting superintendent. In June, 1943, he assumed the duties of superintendent of the Reliance Mill, which position he held until he was elected vice-president in charge of production. At 39, Mr. Koch is one of the youngest executives in the cement industry.

O. W. SEVERENCE was named district sales manager of Des Moines, Ia., for the Pennsylvania-Dixie Cement Corporation, with offices at 617 Old Colony Building. For several years he has been assistant district sales manager at Chattanooga, Tenn.

The Lehigh Portland Cement Company has announced several appointments made recently in various plants. Effective October 21, HARRY A. ZELIFF became assistant superintendent of the Fordwick, Va., plant. Since 1943 Mr. Zeliff has been assistant superintendent and supervising chemist at the Birmingham, Ala., Lehigh plant.

C. E. EICHELBERGER has been named maintenance engineer of Lehigh's plant at Mitchell, Ind., where an extensive program of rebuilding is in progress.

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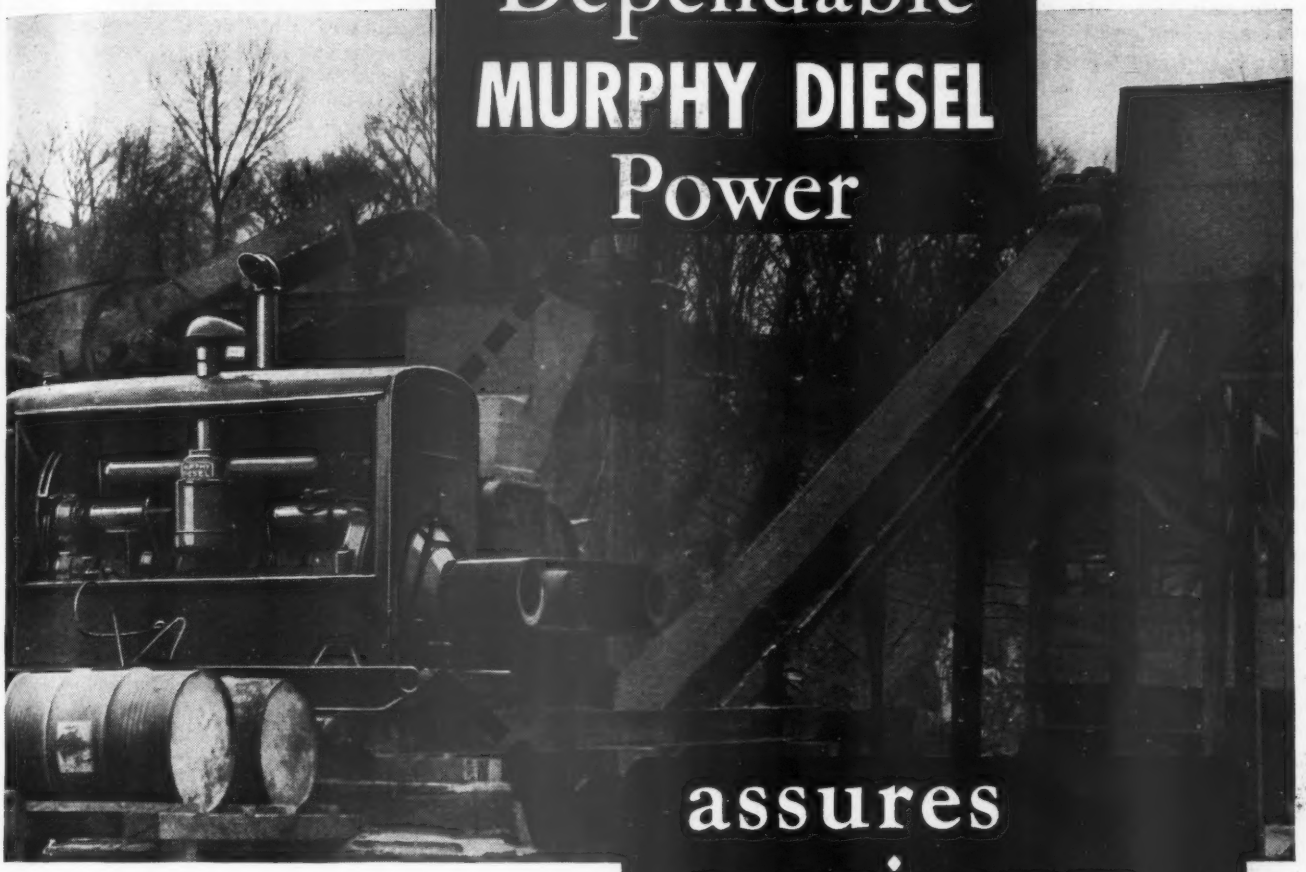

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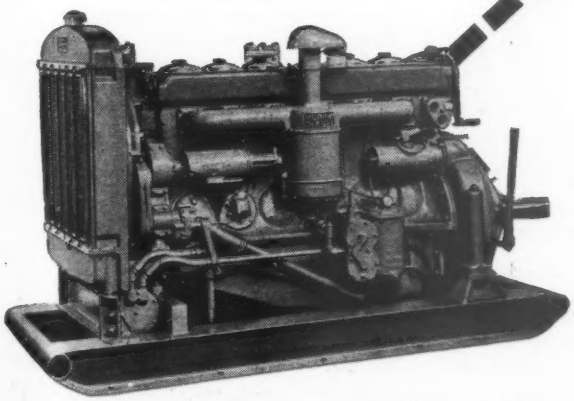

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Mr. Eichelberger had served at the Union Bridge, Md., plant of Lehigh since 1923. There he was in charge of construction when the Union Bridge plant was rebuilt several years ago.

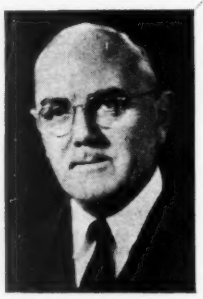
JOHN T. LYNN was promoted to assistant superintendent and supervising chemist of the Lehigh plant at Ormrod, Pa., where he had been chemist for several years.

ARNOLD J. JOHNSON is now superintendent of the Mason City, Ia., Lehigh plant, succeeding W. W. PATTERSON, who resigned on August 15. Mr. Patterson had been superintendent since 1934 and associated with the company since 1922. Mr. Johnson has been with Lehigh since 1935, serving at Alsen, N. Y., as supervising chemist and engineer and later at the main office (Allentown, Pa.) as combustion engineer, specializing in waste heat boilers and kilns.

ROBERT E. JONES, a new comer to Lehigh, has been assigned to the Buffalo plant. Prior to this appointment he was associated with the Hercules Powder Company at Lawrence, Kan.

HENRY B. BURKS, a veteran of World War II, has been named assistant superintendent and supervising chemist of the Birmingham, Ala., plant, where he had been serving before joining the armed forces.

Richard D. Mayne



Ray E. Hoffman

RAY E. HOFFMAN, plant manager for the past 27 years of the Hannibal, Mo., plant of Universal Atlas Cement Company, United States Steel Corporation subsidiary, has retired after 40 years of service at the same plant. Appointed to succeed Mr. Hoffman, effective December 1, is RICHARD D. MAYNE, former mine and quarry superintendent and latterly assistant plant manager at Hannibal.

Mr. Hoffman was employed as mining engineer at the Hannibal plant in 1906. He advanced successively to mine and quarry engineer, assistant plant manager and (in 1919) plant manager.

Mr. Mayne spent several years in engineering, joining Universal Atlas in 1937. He has served successively as industrial engineer at Chicago; superintendent of the company's gypsum operation at Clarence Center, N. Y.; quarry and mine superintendent at Hannibal, and assistant to the general operating manager in New York City. In 1943 he was appointed assistant plant manager at Hannibal, succeeding Paul Kirkbride, who became manager of the company's plant at Independence.

HOMER L. BAKER, who was formerly assistant sales manager of the Louisville Cement Company of Louisville, Ky., has been made sales manager, it was announced recently by company officials. JOHN H. MALLON, former vice-president and sales manager, has been made vice-president in charge of sales.

H. L. Baker

Mr. Baker became affiliated with the firm in 1927 as Southeastern sales representative. Since 1940 he has been assistant sales manager.

RAYMOND WILSON has been appointed superintendent of the Union Bridge, Md., plant of the Lehigh Portland Cement Company, succeeding G. S. LA FORGE, who retired on December 1, 1946. Mr. Wilson has been control engineer in the operating department in Allentown, Pa.

After serving in the army air force during World War I, Mr. Wilson joined the staff of the structural materials research laboratory of the Lewis Institute in Chicago, now the research laboratory of the Portland Cement Association. In 1937 he became a field engineer for Lehigh, succeeding W. M. Harbaugh, who had been promoted to chief engineer.

OBITUARIES

HERBERT E. SWANSON, 38, associate editor of *Rock Products,* was one of the 120 persons who lost their lives in the Hotel Winecoff fire in Atlanta, Ga., on December 7. He had gone to Atlanta on a business trip.

Mr. Swanson, a graduate of the college of engineering, Northwestern University, had been associated with *Rock Products* since 1943. He had previously been employed by the Illinois state highway department.

VINCENT GARRETT DODDS, president of the Sierra Talc Co., died on August 10 as a result of injuries suffered in an automobile accident which occurred while he was returning from a trip to visit some of his mines. Mr. Dodds was born in 1896 at Gouverneur, N. Y. In earlier years he was affiliated with the New York Telephone Co. and the Aluminum Company of America.

THOMAS MCIVOR SR., 67; a former employee of the Commonwealth Quarry Co. at Summit, N. J., died in a New York hospital on November 2 after an extended illness.

GEORGE C. GOODWIN, 23, an employee of the Basalt Rock Company of San Francisco, Calif., died in an accident which occurred on November 5. He was suffocated when he slipped into the sand-filled chute of a truck-loading bunker.

HAROLD WILLIAMS, 49, vice-president and general manager of the Williams Lime Manufacturing Company of Knoxville, Tenn., died recently in that city.

We regret that this portrait of Mr. Miller did not reach us in time to be published with the account of his death in the Dec., 1946 issue.

Conrad Miller

Mr. Miller, son of John A. Miller, Sr., who was the founder of the Pennsylvania-Dixie Cement Corporation, was purchasing agent for that firm from 1917 to 1945.

PETER S. HAURY, a mining engineer affiliated with the Tucson division of the U. S. Bureau of Mines at the University of Arizona, died in Tucson on October 11.

HEMMING I. FRANZ, 43, general superintendent of the Eastern Magnesia Talc Company of Waterbury, Vt., died of injuries received in an accident at the company's No. 2 mine.

WILLIAM F. NUGENT, 76, the founder and former president of the Nugent Sand Company of Louisville, Ky., died on December 23 in a Louisville hospital. Mr. Nugent was the victim of an accident on October 27 in which he sustained a broken hip.

JESSE C. DEVILBISS, 59, vice-president in charge of sales of the United States Potash Co., Inc., Carlsbad, N. M., died on November 29 of a heart ailment in the office of his New York City physician.

Mr. DeVilbiss started his career with the Virginia-Carolina Chemical Corp. of Richmond, in 1912, subsequently serving as manager in Cincinnati, as Southern sales manager, as assistant general sales manager, and as sales manager. He Joined United States Potash in 1932 as sales manager, and became vice-president in charge of sales in 1939.

JOHN J. KELLY, industrial relations manager of the Marquette Cement Manufacturing Company, died on December 7 at the age of 53 years. He became ill on the previous day while visiting the firm's plant at Oglesby, Ill., and died in a hospital at La Salle.

LOREN C. BARTON, one of the founders of the Riverside Cement Co. of Los Angeles, and a vice-president of the concern until his retirement several years ago, died in a Los Angeles sanitarium in December after a brief illness. He was a grand-nephew of Clara Barton, organizer of the American Red Cross. Mr. Barton was 76 years old at the time of his death and had been a Californian since 1897.

FREDERIC JUENGER, traffic manager of the Texas Gulf Sulphur Co. for the past 27 years, died on October 21 in New York City. Mr. Juenger had been associated with Texas Gulf since 1919.

PAUL SHERMAN, owner of the Sherman Stone and Gravel Company of Topeka, Kan., died at his home in that city on November 22 at the age of 61 years.

THERE'S A HERCULES DISTRIBUTOR NEAR YOU

ALABAMA—BIRMINGHAM: Aronov Auto Supply Co., Inc., 420 S. 21st St. MOBILE: Betbeze, 610 St. Anthony. MONTGOMERY: Jake Aronov Auto Parts & Tire Co., Cor. Bell & Whitman Sts.

ARKANSAS—LITTLE ROCK: G. L. Turner, Inc., 320 E. Markham St. MEMPHIS, TENN.: Dealers Truckstell Sales, Inc., 365 S. Parkway, W.

CALIFORNIA—LOS ANGELES: General Truck Equipment Co., 746 S. Central. OAKLAND: A. Pasteris Co., 2200 Wood St.

COLORADO—DENVER: The Colorado Builders' Supply Co., 324 S. Broadway.

FLORIDA—JACKSONVILLE: Clark Equipment Inc., 1839 Main St.

GEORGIA—ATLANTA: (COLLEGE PARK) Carley Trailer & Equipment Co.

IDAHO—TWIN FALLS: Twin Falls Equipment Co., 251 Main Ave., W.

ILLINOIS—CHICAGO: Voltz Bros., Inc., 2520 Indiana Ave. PEORIA: A. W. Moore, 2710 S. Adams St. BETTENDORF, IOWA: Standard Wholesale Co., 1525 State St. ST. LOUIS, MO.: Truck Equipment Co., 511 N. Channing Ave. EVANSVILLE, IND.: Hercules Body Co., Inc.

INDIANA—EVANSVILLE: Hercules Body Co., Inc., FORT WAYNE: Peerless Manufacturing Co., 4227 Bluffton Rd. INDIANAPOLIS: John Guedelhoefer Wagon Co., Inc., Kentucky Ave., at Georgia Ave. LOUISVILLE, KY.: J. Edinger & Son, 1010 Story Ave. CINCINNATI, O.: The Bode-Finn Co., 2650 Spring Grove Ave.

IOWA—BETTENDORF: Standard Wholesale Co., 1525 State St. CEDAR RAPIDS: E. Cahn & Sons, Inc. SIOUX CITY: Barton-Stephens & Co., 1909 E. Fourth St.

KENTUCKY—LOUISVILLE: J. Edinger & Son, 1010 Story Ave. HUNTINGTON, W. VA.: Huntington Truck Equipment Co., 3004 Third Ave. EVANSVILLE, IND.: Hercules Body Company, Inc. CINCINNATI, O.: The Bode-Finn Co., 2650 Spring Grove Ave.

LOUISIANA—NEW ORLEANS: Magnolia Equipment & Security Corp., 900 Jefferson Hwy. SHREVEPORT: Dealers Truck Equipment Co., Inc., 1561 Texas Ave. MEMPHIS, TENN.: Dealers Truckstell Sales, Inc., 365 S. Parkway, W.

MARYLAND—BALTIMORE: United Truck Equipment Co., 1242 S. Paca St.

MASSACHUSETTS—CAMBRIDGE: Hercules-Campbell Body Co., 130 Brookline St.

MICHIGAN—DETROIT: Waggy-Hoffman Equipment Co., 14089 Schaefer Hwy. CHICAGO, ILL.: Stahmer Supply Co., 135 S. LaSalle St.

MINNESOTA—ST. PAUL: General Truck & Equipment Co., 2535 University Ave.

MISSISSIPPI—MEMPHIS, TENN.: Dealers Truckstell Sales, Inc., 365 S. Parkway, W. MOBILE, ALA.: Betbeze, 610 St. Anthony.

MISSOURI—KANSAS CITY: American Body & Equipment Co., 1411 Charlotte St. ST. LOUIS: Truck Equipment Co., 511 N. Channing Ave.

MONTANA—BILLINGS: Western Construction Equip. Co., 505 N. 24th St. MISSOULA: Western Construction Equip. Co., 218 W. Pine St.

NEBRASKA—LINCOLN: Highway Equip. & Supply Co., 21st & N Sts. SCOTTSBLUFF: Colorado Builders Supply Co., 602 W. 27th St.

NEW MEXICO—ALBUQUERQUE: The Harry Cornelius Co., 1510 N. Second St.

NEW YORK—BUFFALO: Truckstell-Wilcox, Inc., 224 W. Utica St. TARRYTOWN: Hercules-Campbell Body Co., Inc. WATERLOO: Hercules-Campbell Body Co.

NORTH CAROLINA—RALEIGH: J. B. Hunt & Sons, 323-25 W. Martin St. SPRUCE PINE: Mitchell Distributing Co.

NORTH DAKOTA—ST. PAUL, MINN.: General Truck & Equip. Co., 2535 University Ave.

OHIO—CANTON: Ewing Brothers, 929-41 Cleveland Ave., N. W. CINCINNATI: The Bode-Finn Company, 2650 Spring Grove Ave. CLEVELAND: The Trailmobile Company, 1808 E. 22nd St. COLUMBUS: Hercules Body Sales Co., 580 Hamlet St. UHRICHSVILLE: Wells Body Co., 112-20 Lake St. YOUNGSTOWN: O'Dea Truck Body Sales, 2035 Ohio Ave. HUNTINGTON, W. VA.: Huntington Truck Equip. Co., 919 Sixth Ave. DETROIT, MICH.: Waggy-Hoffman Equipment Co., 14089 Schaefer Highway.

OKLAHOMA—LAWTON: Tompkins Auto Salvage Co., 917 S. Second St. OKLAHOMA CITY: 1801 N. E. Ninth St. TULSA: The Diesel Power Co., 4th & Elgin Sts.

OREGON—PORTLAND: Newell Truck Equipment Co., 316 N. Russell St.

PENNSYLVANIA—ALTOONA: Brumbaugh Body Co., 100 Plank Road. ERIE: The Trailmobile Co., 1223 Walnut St. LEBANON: M. A. Brightbill Body Works, E. Cumberland St. at 7th Ave. PHILADELPHIA: Eastern Body Co., 31st & Fletcher Sts. PITTSBURGH: Hercules-Pittsburgh Body Co., 1717 Mary St., S. S.

SOUTH CAROLINA—COLUMBIA: South Carolina Equipment Co., P. O. Box 295.

SOUTH DAKOTA—ST. PAUL, MINN.: General Truck & Equip. Co., 2535 University Ave.

TENNESSEE—CHATTANOOGA: Ted Nelson Service & CHR Alignment Co., 416-18 Market St. KNOXVILLE: Knoxville Structural Steel Co., P. O. Box 1512. MEMPHIS: Dealers Truckstell Sales, Inc., 365 S. Parkway, W. NASHVILLE: Carter, Inc., 650 Murfreesboro Rd.

TEXAS—DALLAS: Truck Equipment Co., 2409-11 Commerce. FORT WORTH: Truck Equip. Co. HOUSTON: McArthur Welding & Press Co., 5525 Clinton Dr. SAN ANTONIA: Patton Machinery Co., 1318 N. Alamo St. CORPUS CHRISTI: Truck Equip. Co., 1501 Port Ave.

UTAH—SALT LAKE CITY: Hercules Body Sales Co.

VIRGINIA—NORFOLK: A. S. Drumwright & Co., 1921 Brambleton Ave. RICHMOND: Crenshaw Equipment Co., Inc., 304 E. Main St.

WASHINGTON—SEATTLE: Allied Trailer & Equip. Co., 1331 Third Ave.

WEST VIRGINIA—BLUEFIELD: Truck Equip. Engineering Co., P. O. Box 387. CHARLESTON: West Virginia Tractor & Equip. Co., P. O. Box 473. CLARKSBURG: West Virginia Tractor & Equip. Co., 100 Wood St. HUNTINGTON: Huntington Truck Equip. Co., 919 Sixth Ave.

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DUMP BODIES • POWER TAKE-OFFS
HYDRAULIC HOISTS

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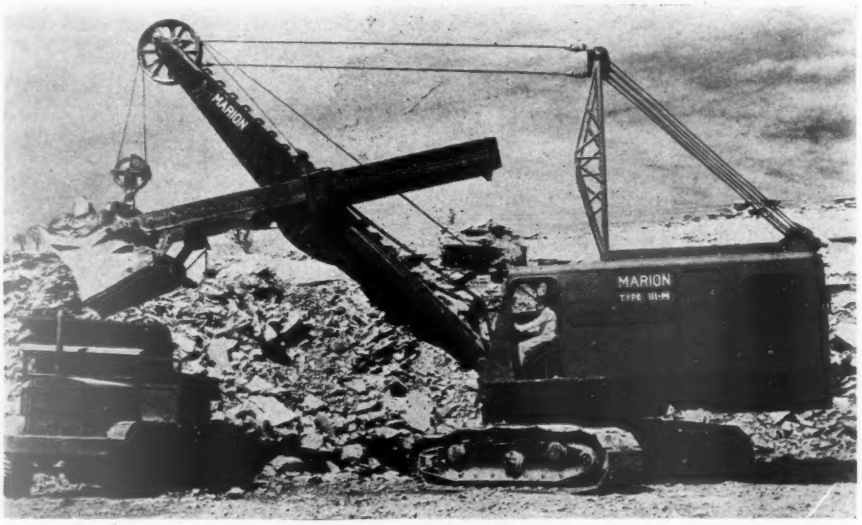
Part of the fleet of Hercules Huskies operated by the R. B. Tyler Company on a road construction project near Miami, Florida. Working 24 hours a day, these semi-trailer dump bodies carry 12 cubic yards per trip over a 44-mile round trip route.

On the big hauling and dumping jobs, one Hercules Husky does the work of two standard size dump trucks. That's a 50% savings in direct labor costs right there. Better still, you can add the savings on fuel, tires and maintenance, made possible through FEWER trips with LARGER loads. Logical? . . . you bet it is! Check the list on the opposite page for your nearby Hercules distributor and ask him to show you the facts and figures about the Hercules HUSKIES . . . designed and built for the big jobs.

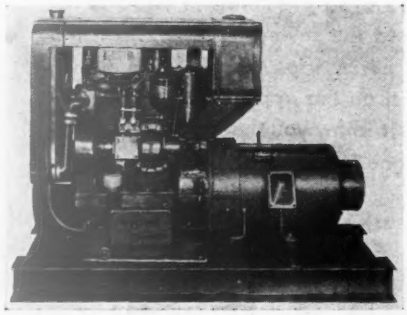
HERCULES
DUMP BODIES • POWER TAKE-OFFS
HYDRAULIC HOISTS

NEW MACHINERY REVIEW—1946*

Above:
Three sizes of open-bowl scrapers, matched in capacity to the power of the recently introduced new Caterpillar diesel tractors, and built to perform with them as a complete earth-moving unit, are in production at the Caterpillar plant in Peoria, Ill. Features claimed for this bowl design are stability, visibility, and easy access for shovel and dragline loading. Optional tire sizes can be used to match flotation to job conditions. (February, 1946)



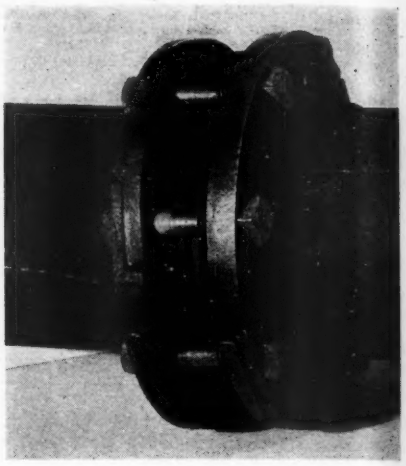
Above:
This 3½- to 4 cu.-yd. diesel power shovel, which can be converted to dragline, clamshell, or crane service, is a product of the Marion Power Shovel Co., Marion, O. Known as the Type III-M, it is expected by the company to be of great service in the mining, quarrying and stripping fields. Variable crawler widths and lengths are offered on this all-welded machine. A low center of gravity gives stability under all working conditions. The gantry can be lowered to cab roof level by paying out the boom-hoist line. (November, 1946)



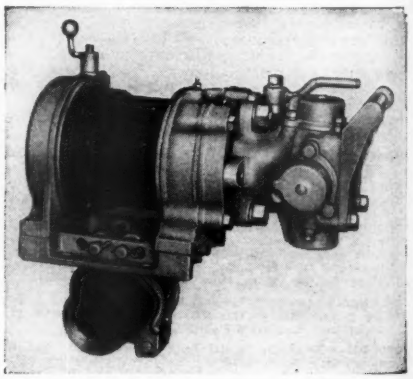
Left:
Constant, steady power line quality voltage without the use of accessory regulating equipment was the objective when the new Sheppard diesel a.-c. generating sets were designed. The recently developed factory-set "Regulectric" system is employed to maintain voltage ±2 percent from no load to full load. The R. H. Sheppard Co., of Hannover, Pa. (October, 1946)

Right:
Augmenting the regular line of ESCO manganese steel products, the Electric Steel Foundry of Portland, Ore., recently announced a new general-purpose, cast-welded dipper. Offered in a size range from ⅜ to 5 cubic yards, the dipper is also available in larger sizes on special order. (January, 1946)

*Date in caption refers to issue in which a more complete description of the item appeared.



Above:
The Flexseal hose joint for rubber hose has been developed by the B. F. Goodrich Co., Akron, O., for applications where a rubber-to-rubber contact between lengths of hose is desired. No metal part is interposed at any point when this method of connection is utilized. Flexseal is recommended for the larger diameters of suction and discharge hose which handle abrasive materials or corrosive liquids. With this joint it is also possible to join rubber hose to metal pipe, provided that the pipe has a companion flange. (November, 1946)



Above:
A small lightweight air-powered hoist, the "Air-winch," is capable of lifting 500 pounds, although it weighs only 85 pounds. It is made by the Sullivan Division of the Joy Manufacturing Co., Oliver Bldg., Pittsburgh, Pa. The device is 18 inches long, 9½ inches high and 11 inches wide; it has a capacity of 500 feet of ¼-inch rope. (November, 1946)

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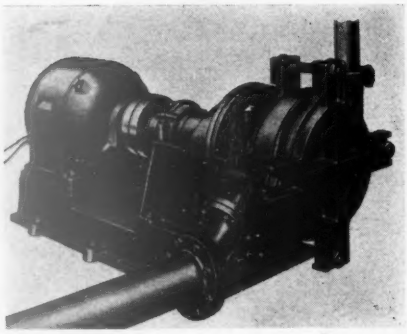
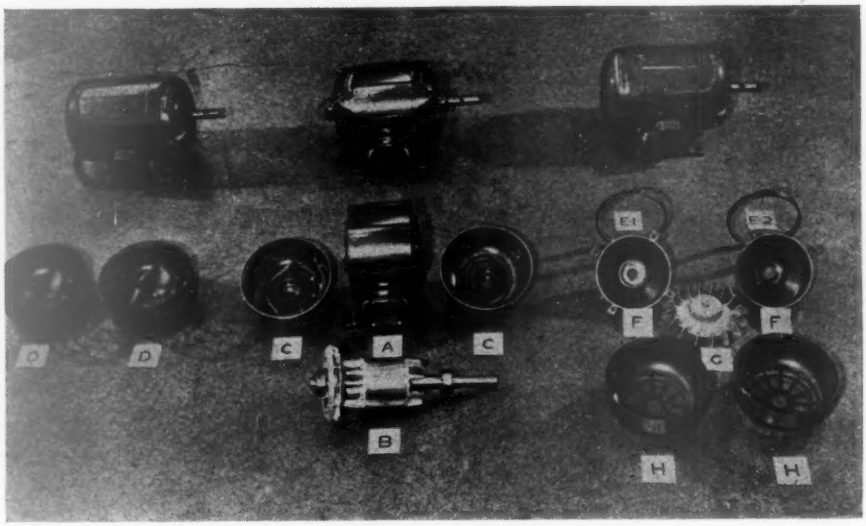
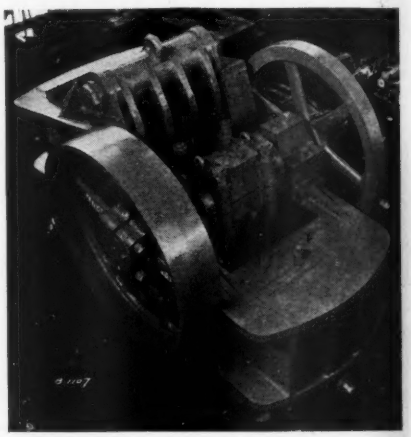


Above:
Users of slurry pumps for handling sludge, silt, cement slurries, or residue from filters and classifiers may now obtain the new Morris "Type R" centrifugal slurry pump, manufactured by the Morris Machine Works of Baldwinsville, N. Y. The shell of this pump, which is available in - to 6-inch sizes, is interchangeable for either right-or left-hand rotation. The suction-end discharge nozzles can be rotated around the axis of the pump to positions in any of the four quadrants. (August, 1946)

Above:
New additions have been made to the Dodge "job-rated" truck line with the manufacture of two 3-ton heavy duty trucks in five wheelbases ranging from 136 to 196 inches. One truck has a gross vehicle weight rating of 20,000 pounds, and the other a weight rating of 37,000 pounds. As a tractor, each has a rating of 37,000 pounds. The 128-hp. engine used in these vehicles has sodium-cooled valves. Both models have five speed transmissions, with a power take-off opening on both sides. Air brakes are available as extra equipment. (November, 1946)

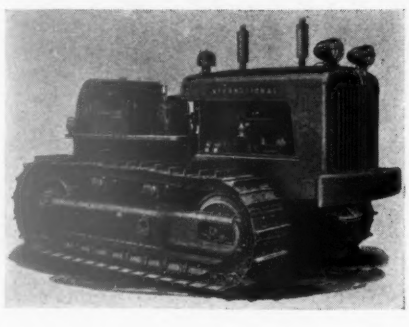


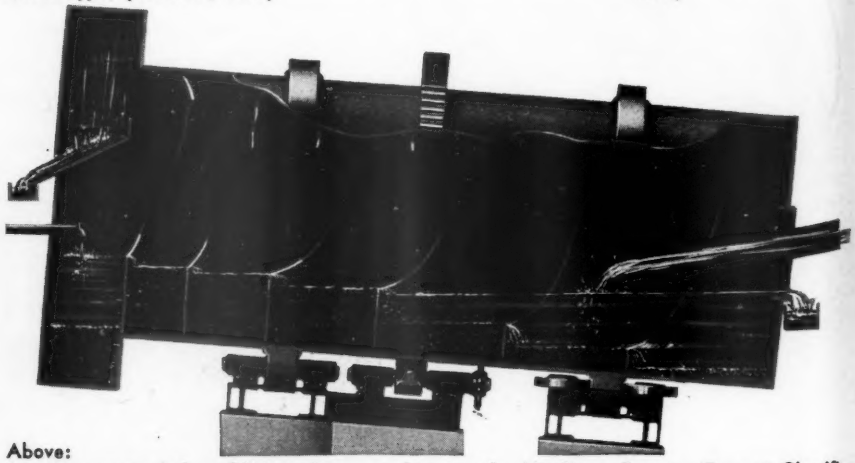
Above:
New alternating current motors, to be known as the "Life-line" series, have been announced by the Westinghouse Electric Co., Buffalo, N. Y. These new motors, which incorporate improved construction features, are 35 percent smaller than former models. Standardization and interchangeability of parts make it possible to convert the motor into a splash-proof, open protected or totally-enclosed, fan-cooled type. (October, 1946)



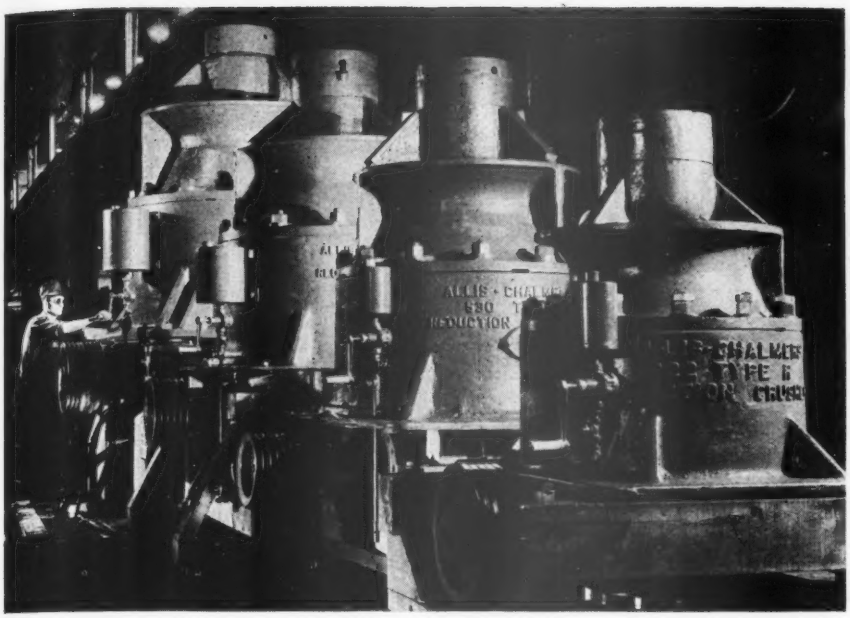
Above:
The "Type H Jaw Crusher" of the Traylor Engineering & Manufacturing Company, Allentown, Pa., is now available in 15 sizes ranging from an 8- by 12-inch model to a 56- by 72-inch unit. Smaller types are built with a two-piece Pitman, while the larger ones have a rod-type Bulldog Pitman. (May, 1946)

Below:
A new diesel engine crawler tractor, Model TD-24, has been announced by the International Harvester Co. of Chicago. It is the largest tractor ever built by the company, and has a total weight of approximately 35,000 pounds. The International full diesel engine, which has a built-in gasoline starting system, develops 130 drawbar horsepower. (March, 1946)

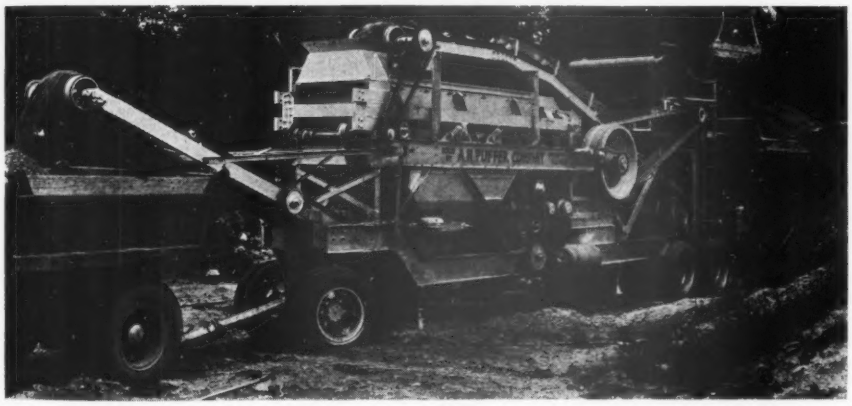


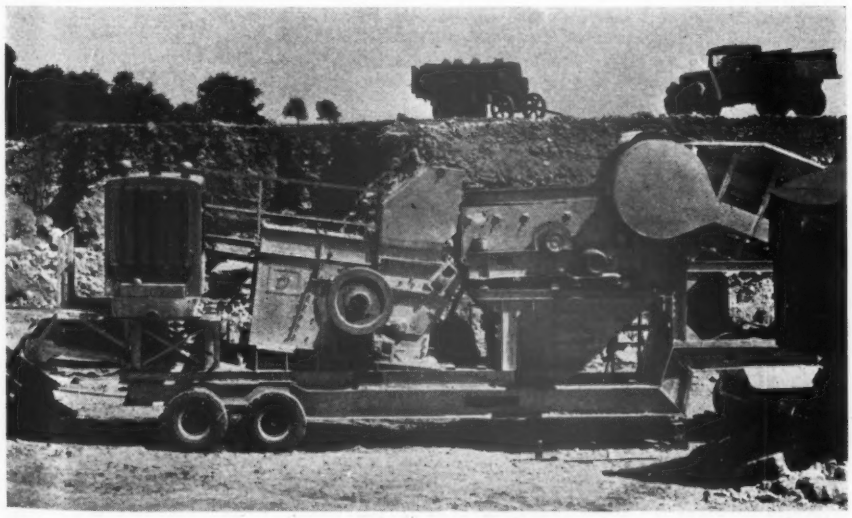


Above:
Announcement of the addition of a gear drive on the Hardinge Counter Current Classifier has been made by the manufacturer at York, Pa. This gear gives a positive drive to the single moving part of the classifier, the slowly moving drum. The classifier is used in closed circuit operations and is recommended for various classifying steps ahead of thickening and for washing high specific gravity materials. (October, 1946)

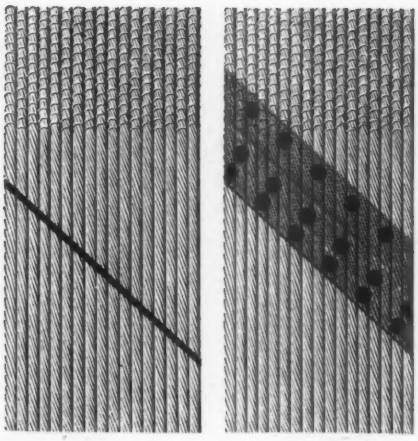


Above:
A new "Type R" reduction crusher with a "Speed-Set" product control has been announced by the Allis-Chalmers Mfg. Co., Milwaukee, Wis. Special features include a recessed spider cap to reduce wear, spherical-type spider bearings, a one-piece manganese steel inner crushing surface held in place by a self-locking device, a scientifically designed crushing chamber, dust seal, resilient mountings, and an automatic relief valve. The Type R is available in four sizes, the largest of which crushes 312 t.p.h. (October, 1946)





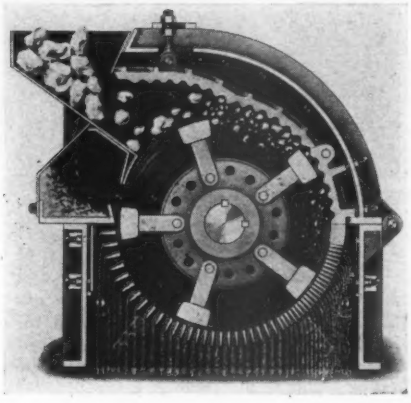
Above:
A portable crushing plant, featuring a "Non-Clog" hammermill has been designed by the Dixie Machinery Co., St. Louis, Mo. This plant may be adjusted to produce a wide combination of product sizes and can also produce agricultural limestone. The plant consists of a 40-inch apron feeder, a two-deck vibrating screen, a 36-inch belt conveyor and a Dixie "Non-Clog" hammermill, driven by a Caterpillar D17000 engine. This equipment is mounted on a trailer of welded I-beam construction, which rolls on 24 pneumatic tires. (July, 1946)

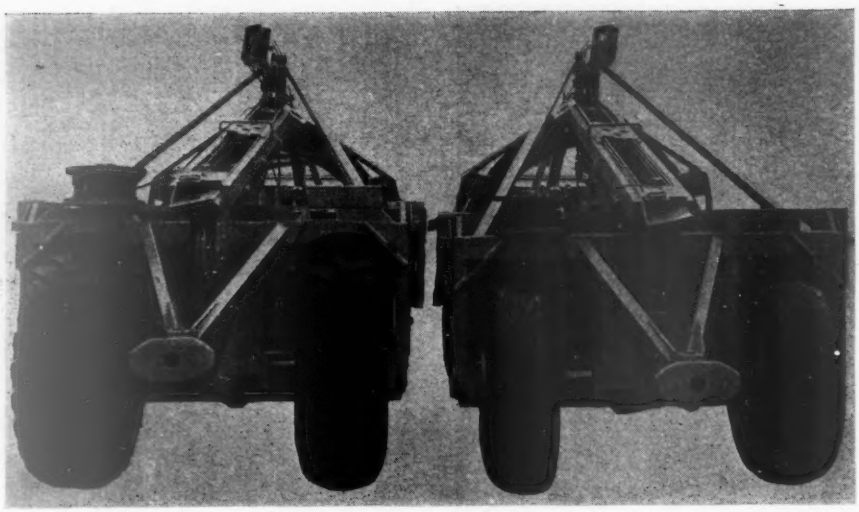


Above:
The "Extensible-tip" belt splice of the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J., provides multiple stress relief, uniformly distributed over an area of the belt where the duck ends. In addition, the end is welded to the adjacent ply by elastic rivets, vulcanized in place. The illustration shows, at left, the warp threads cut on a line and bonded only once; and at right, every warp thread is interrupted at two or more points, and bonded with stress relieving elastic rivets, which absorb and distribute the stress over an area. (January, 1946)

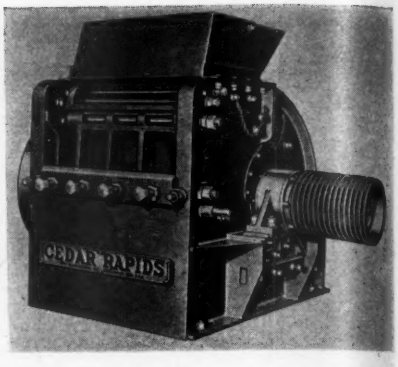
Left:
The newest addition to the line of portable crushing plants offered by the Iowa Manufacturing Co., Cedar Rapids, Ia., is the "Junior Tandem." By putting a portable primary crusher ahead of the Junior Tandem, the producer can obtain a complete quarry plant, and the addition of a multi-bin unit with sizing screens makes it a multi-sizing gravel or stone crushing plant. The Junior Tandem is made up of standard Cedarapids units, with matched capacities. (January, 1946)

Below:
This heavy-duty industrial hammermill is a recent product of the Diamond Iron Works, Inc., 2nd and 18th Streets, Minneapolis 11, Minn. The housing is of all-welded structural steel plate construction and permits ready access to the hammers. Outside adjustments are provided for anvil and grate clearance. In case of a power failure and stoppage, the grates can be lowered without opening the cover and the machine cleans itself. (January, 1946)

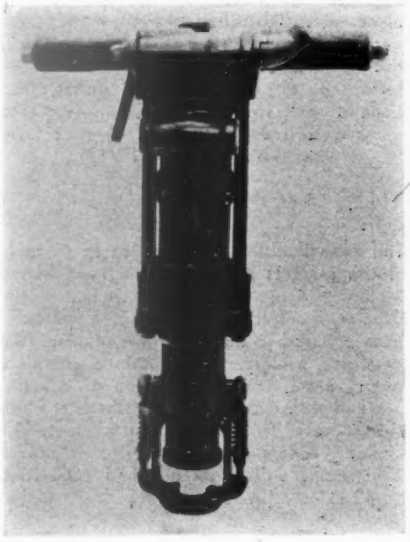




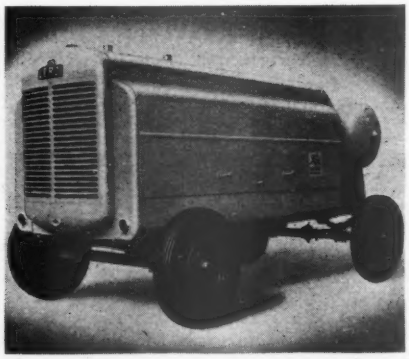
Above:
R. G. LeTourneau, Inc., of Peoria, Ill., has announced that it is equipping its Tournapulled LP "Carryall" scrapers with 21.00 by 24 tires. This larger size is said to increase flotation, reduce rolling resistance and improve off-the-road operation. Scraper clearance has been increased four inches. (April, 1946)



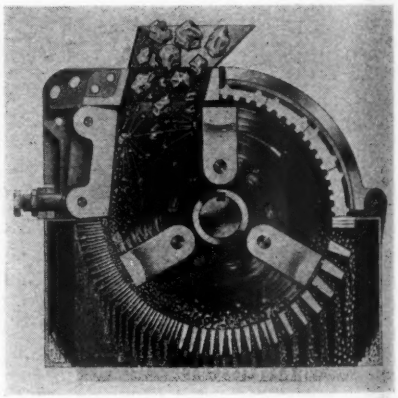
Above and Below:
Three new hammermills, the 2033, 3033 and 4033, have been added to the Cedarapids line of the Iowa Manufacturing Co., Cedar Rapids, Iowa. The first two digits of the model number indicate the width of the feed opening, while the last two refer to the swing diameter of the hammers. The mills vary in weight from 7,000 to 12,000 pounds. A new non-clogging 180-degree grate and a heavy flywheel, which tends to flatten out the power curve, are features of the machine. The 33-inch swing diameter of the hammers gives the usual hammer speed with lower r.p.m., which is said to result in a higher percentage of feed brought down to specified size per unit of power. (November, 1946)



Above:
The "D-45" rock drill is operated by a new type of patented valve. The machine, a product of Schramm, Inc., Westchester, Pa., is made of drop-forged steel throughout. The drill can be furnished for either 7/8-inch or 1-inch steel. (November, 1946)



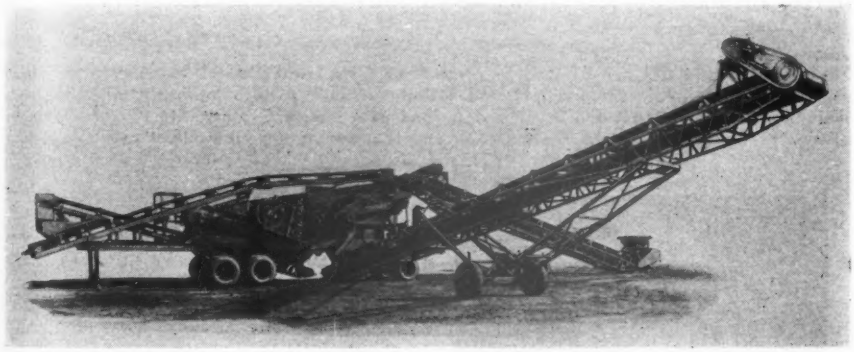
Above:
The Airmaster series of portable air compressors has been announced by the Le Roi Company of Milwaukee, Wis. Ten models comprise the series. The lighter compressors are gasoline-engine-powered, while the heavier models are driven by diesel engines. (April, 1946)



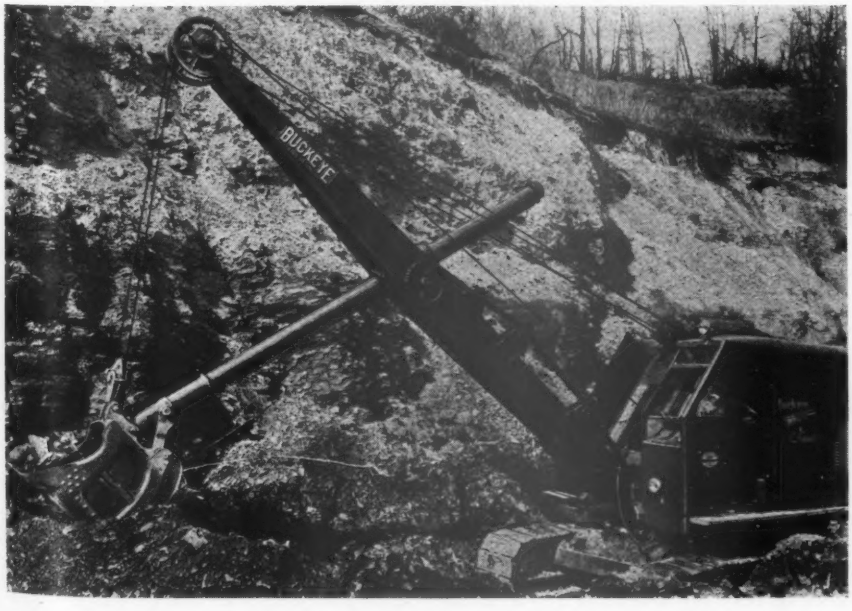
Below:
The TL-20 shovel, a product of the Thew-Lorain Shovel Co., Lorain, O., can be equipped with a choice of five interchangeable booms, and ten different types of mountings. The TL-20 may be mounted on either pneumatic tires or crawler tracks. Rubber tire mountings cover all combinations of four- and six-wheel units, with or without front wheel drive. (May, 1946)

Above:
Clamshells of all-welded construction ranging from 1/2-cu.-yd. to 2-cu.-yd. capacity are offered by the O. S. Johnson Co., Champaign, Ill. (February, 1946)

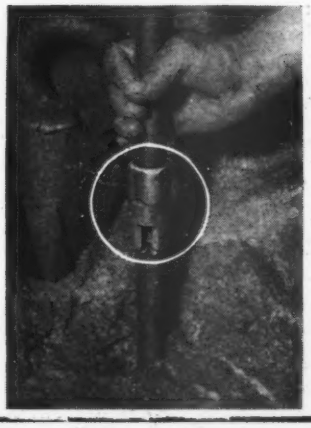
Above:
The illustration above shows a Mississippi wagon drawn by an International ID-9 tractor, which has been modified for dirt hauling by the M-R-S Manufacturing Co., Jackson, Miss. The tractor is equipped with a hydraulic system that brings the weight of the wagon to bear on the rear wheels of the tractor when a hard pull is encountered. (March, 1946)



Above:
In this portable, semi-electric-powered duplex screening and crushing plant, the screen and the conveyors are driven by electric motors, from power supplied by a diesel-electric plant. The "No. 46-VE," as the plant is known, is a product of the Pioneer Engineering Works, Minneapolis 13, Minn. The plant has an operating height of 14½ feet and a moving weight of 64,000 pounds. (August, 1946)



Below:
A magnetic drill extractor made of Alnico magnet steel is capable of lifting approximately 25 times its own weight in vertical lifts. According to the Dings Magnetic Separator Co., 509 E. Smith St., Milwaukee 7, Wis., makers, the extractor is normally used by attaching it to an old jackbit with a fastening screw, which is supplied with each extractor. To do this, the edges are ground off the old jackbit, and the center hole is threaded. The fastening screw is then passed through the hole in the center of the extractor, and screwed up tight. The jackbit can then be attached to a length of drill rod, and the broken piece fished out. A wooden pole can also be used, with the extractor permanently fastened to it. The extractor, with jackbit attached, is light enough to carry in a pocket. (May, 1946)



Above:
• A hydraulic loader, designed for use with the Case industrial tractor is available from the Marion Machine Co., Marion, N. C. The "Owen Loader" uses a patented "arm and shoulder movement" to dig a ½-cu.-yd. load from a pile or bank and dump it into a truck at the rear without turning the tractor. This is accomplished by a hydraulic mechanism which moves the bucket in two small arcs over the head of the operator, to discharge the load automatically to the rear of the tractor. Dumping clearance is eight feet. Two sets of hydraulic cylinders supply the digging and lifting power. In digging, they erect a "crowding" impulse against the loading arm, thus reducing strain on the tractor chassis. (October, 1946)

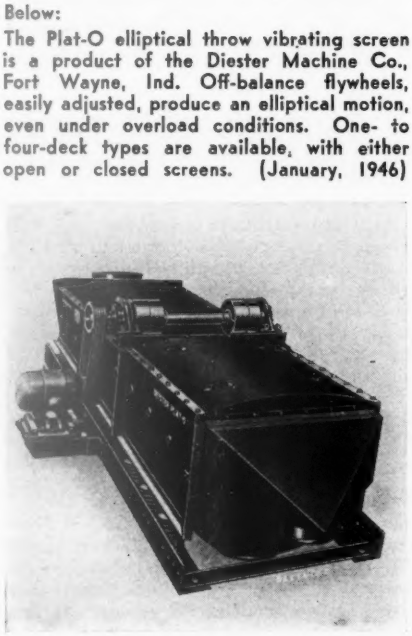
Left:
The Buckeye Traction Ditcher Co., of Findlay, O., recently announced its new Model 70 "High Lift Clipper" power shovel, which features a longer boom and dipper stick than earlier models. All operations are vacuum power controlled. (August, 1946)

Below:

An electronic feed regulator for hammermills, attrition mills and cutters is now being marketed by Max Mosher, 130 W. 42nd Street, New York City. The Mosher automatic control is a virtual robot operator. By means of standard radio tubes and simple relays it controls the feeder motor to provide a steady feed to the pulverizing machinery, in strict accordance with the capacity of that machinery, regardless of material variations and other changing conditions. (December, 1946)

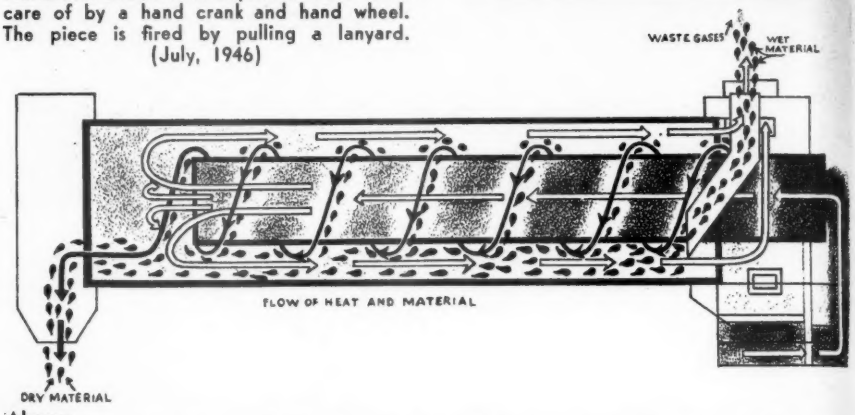
Below:

The Plat-O elliptical throw vibrating screen is a product of the Diester Machine Co., Fort Wayne, Ind. Off-balance flywheels, easily adjusted, produce an elliptical motion, even under overload conditions. One- to four-deck types are available, with either open or closed screens. (January, 1946)



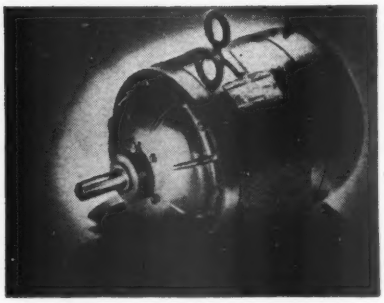
Left and Right:

An industrial gun which fires extra heavy shotgun ammunition has been developed by the Remington Arms Co., Bridgeport, Conn. It is of particular value in the cement industry, in that it can be used to break up clinker rings in kilns, without the necessity of allowing the kilns to cool. It is, in fact, easier for the gun to shoot out the clinker ring when the kiln is at maximum heat. Time for reheating the kiln is also saved, of course. The gun uses ammunition of approximately 8 gauge and fires a three-ounce lead projectile at a muzzle velocity of 1,600 f.p.s. The device weighs 92 pounds, is equipped with an automatic ejector, and cannot be fired until the action is completely closed. Horizontal and vertical adjustments are taken care of by a hand crank and hand wheel. The piece is fired by pulling a lanyard. (July, 1946)



Above:

The L. R. Christie Co., 17 E. 42nd St., New York City, manufactures a rotary dryer which utilizes the semi-direct heat principle, and is designed to cope with the problems of the nonmetallic minerals industry. The dryer is described as a type of "rotary retort" which virtually eliminates all air-flow through the material, and thus avoids the problem of picking up dust. (March, 1946)

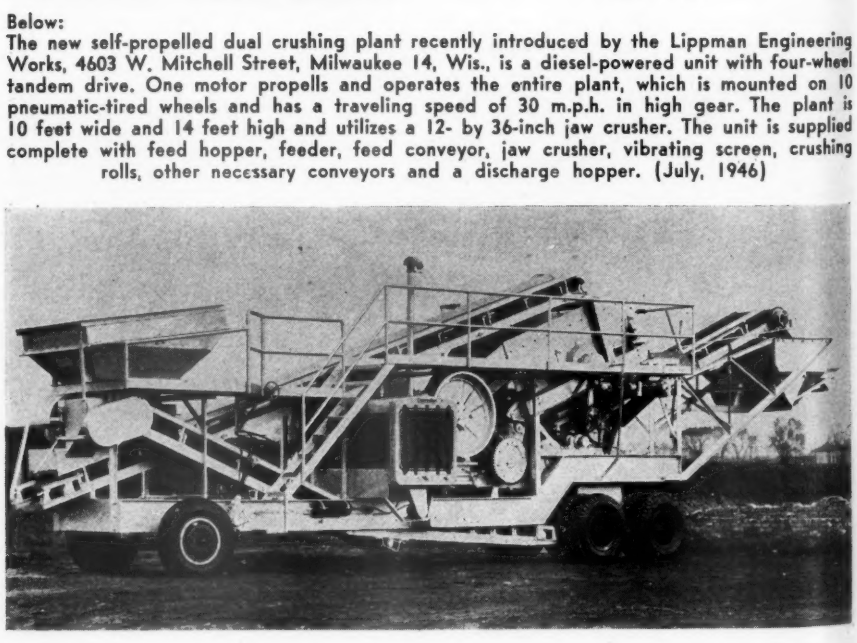


Left:

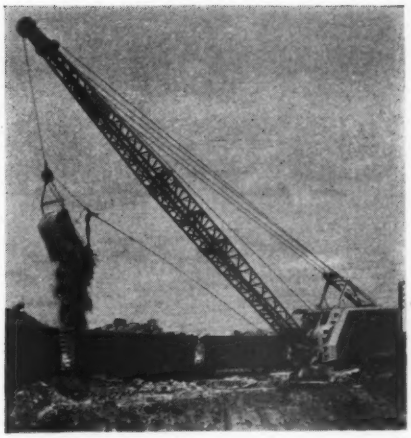
A totally-enclosed, fan-cooled motor especially designed for use in extremely dusty, dirty and corrosive atmospheres has been added to the "Tri-Clad" reduction series of the General Electric Co., 1 River Rd., Schenectady 5, N. Y. The new motor is available in standard, explosion-proof and dust-explosion-proof types, from 1 to 1,000 hp. Low starting current, with balanced design, makes the new Tri-Clad suitable for full voltage starting and a high pull up torque. (August, 1946)

Below:

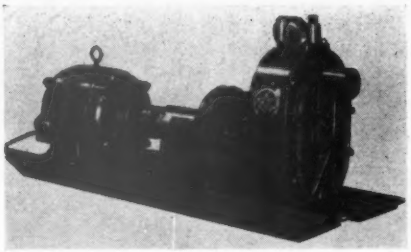
The new self-propelled dual crushing plant recently introduced by the Lippman Engineering Works, 4603 W. Mitchell Street, Milwaukee 14, Wis., is a diesel-powered unit with four-wheel tandem drive. One motor propells and operates the entire plant, which is mounted on 10 pneumatic-tired wheels and has a traveling speed of 30 m.p.h. in high gear. The plant is 10 feet wide and 14 feet high and utilizes a 12- by 36-inch jaw crusher. The unit is supplied complete with feed hopper, feeder, feed conveyor, jaw crusher, vibrating screen, crushing rolls, other necessary conveyors and a discharge hopper. (July, 1946)



Right:
A 20-ton-capacity Bay City Model 65 crane, which is standard construction except for the high collapsible gantry, a feature seen previously only on cranes with long booms. It is now standard on all Model 65 installations, and is shown here handling a 32.1-cubic-foot dragline bucket on a 55-foot boom, while excavating clay for a cement plant.

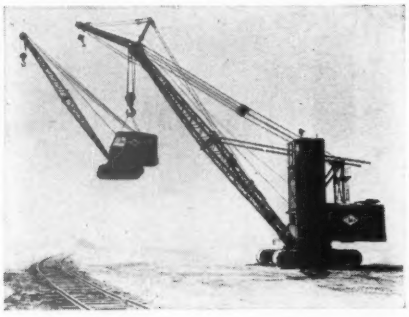


Above:
The largest truck tire ever built in the 48-year history of the Goodyear Rubber Co., Akron, O., is inspected by J. E. Mayl, vice-president. The 27.00 x 33 tire, intended for earth moving equipment, weighs 1,482 pounds, and has an overall weight of 1,627 pounds, including rubber tube and flap. It has a load rating of 31,050 pounds at 40 pounds inflation pressure at 10 m.p.h. and a rating of 27,600 pounds at 25 m.p.h., 40 pounds inflation pressure. (September, 1946)

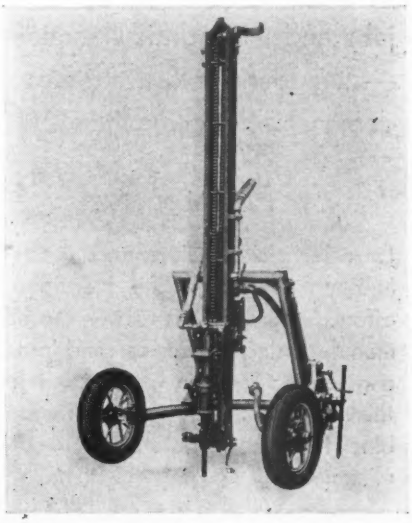


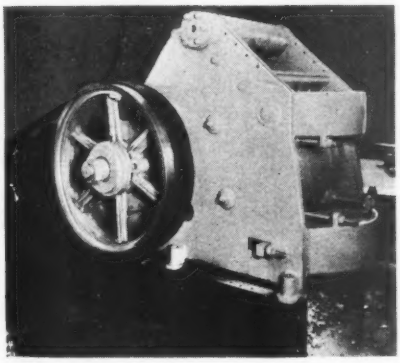
Above:
The "Type EM" self-priming centrifugal mine gathering pump is a modification of an earlier pump made by Marlow Pumps, Ridgewood, N. J. This model has no ports, by-passes or other auxiliary devices, and will make a suction lift as high as 25 feet. It is fitted with a four-vane open-type impeller, with relatively high clearances between the tips of the impeller vanes and the tips of the diffuser vanes. This facilitates priming when large quantities of solids are handled. Capacity, 40 to 240 g.p.m. (November, 1946)

Below:
A convertible crane with a lifting capacity of 100 tons is being manufactured by the Lima Locomotive Works, Inc., Lima, O. When equipped as a shovel or dragline, this machine, the Type 2000, handles a 5-cu.-yd. bucket. In the illustration the machine is shown as a crane, lifting a smaller crane. The Type 2000 is available powered by either a diesel or electric unit, and can be converted in the field. (February, 1946)

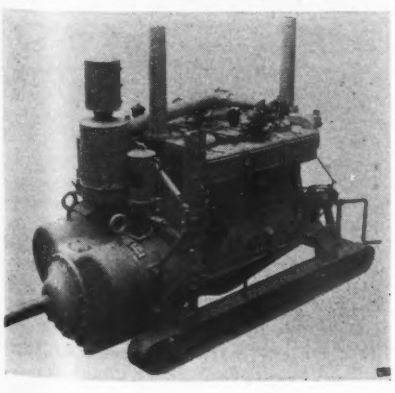


Below:
A wagon drill that uses a heavy-duty drifter has been developed by the Worthington Pump and Machinery Corp., Harrison, N. J. Heat-treated alloy steel is used in all major parts of this drill, the Model UMW-40. The drifter can be converted to wet drilling. Strong rotation, low air consumption and exceptional drilling speed are said to give low cost per foot of drilling. (January, 1946)





Above:
The principle of "crushing without rubbing" employed in the "Kue-Ken" double jaw crushers of the Straub Manufacturing Co., 534 Chestnut St., Oakland 7, Calif., has now been applied to the "Simplex" single jaw crusher manufactured by the same firm. The new model incorporates an overload safety device designed to protect the crusher against tramp iron or severe overload. The main drive pulley is not fastened to the shaft, but drives through the overload safety device built into the hub. The crusher has a sealed pump and splash lubrication system. (July, 1946)



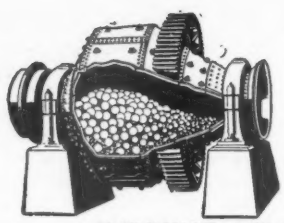
The engines of this Minneapolis-Moline "Dual Power" unit (above) may be operated separately. Engine operating speed range is 800 to 1400 r.p.m. Greatest power delivered at 1400 r.p.m. is 206 hp., with butane gas for fuel.
Left: Powered by another product of Minneapolis-Moline, the UT-1 industrial tractor, a Lull "Shoveloader" bites into a pile of aggregate. The UT-1 is available in three sizes.

Products that stand the test of Time

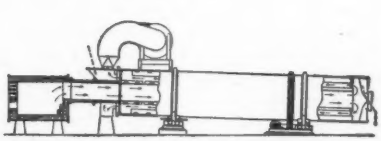
HARDINGE BUILDS A COMPLETE LINE

☆ ☆ ☆ ☆

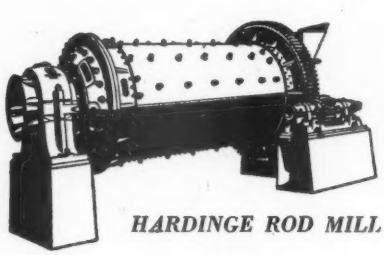
The completeness of the Hardinge line is one of its many outstanding features. Four typical units are shown here. To the prospective purchaser, buying new equipment and replacing old, this means that for practically every process or operation there is a Hardinge unit engineered to meet the need. Buying from a single source — from a manufacturer whose products stand up under the hardest jobs and most difficult conditions — has definite advantages and demonstrable economies.



HARDINGE MILL



RUGGLES-COLES ROTARY DRYER



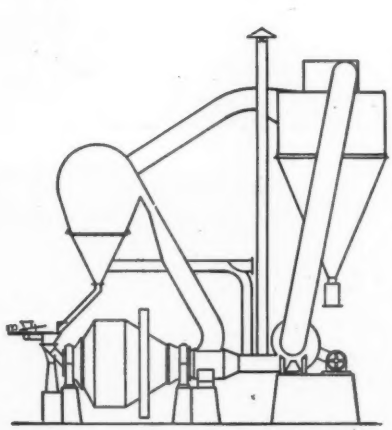
HARDINGE ROD MILL

Maintenance

Extremely low maintenance costs are another advantage the Hardinge line offers. Sturdy construction, precision manufacturing processes, and practical engineering by men who know the jobs the equipment has to do . . . these combine to make maintenance expense a minimum.

Surveys

Let trained men from the nearest Hardinge branch office assist you to determine your equipment needs. Nominal surveys are made without charge, and you can depend on the recommendations made. Consult the list of branch office addresses below.



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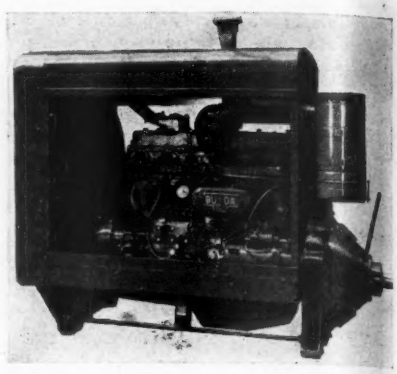
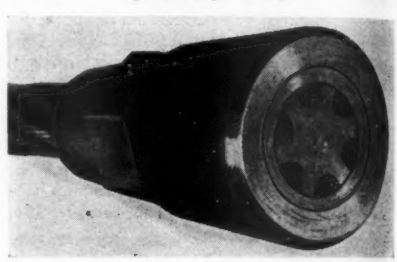
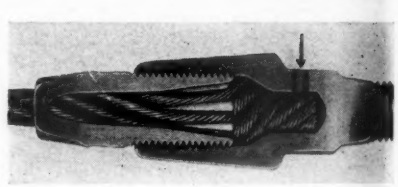


Above:
The Buda Co., of Harvey, Ill., has a new model industrial type diesel engine in production. It is a vertical, overhead-valve, four-cycle engine, and is said to be capable of developing 158 hp. at 1,800 r.p.m. for intermittent service, or 140 hp. for continuous service. The engine has six cylinders. (February, 1946)

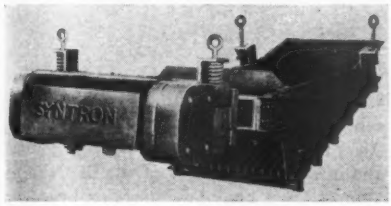




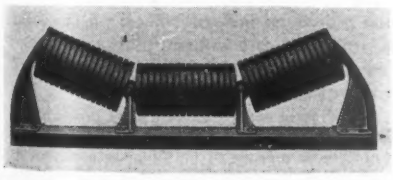
Above:
A device intended to dampen vibration stresses and prevent weak point crystallization and resultant failure of wire rope is the Electroline Fiege wire rope connector. Made by the Electroline Co., 4121 S. LaSalle St., Chicago, Ill., this connector is available in many different types to fit all rope sizes. A feature of this device is the inspection hole drilled in the socket which permits inspection of the wires in the joint after assembly. (November, 1946)

Above:
The hoist illustrated, "Model HKK Single Drum Safety Hoist," made by the Gardner-Denver Co., Quincy, Ill., features a spring-loaded safety brake, which is held in the off position by air pressure. If the air supply fails for any reason, the brake is instantly applied. (May, 1946)

Above:
• The Model IT-4 Traxcavator is the latest development of the Trackson Company, Milwaukee 1, Wis. It is mounted on and powered by a Caterpillar D-4 tractor, and has a 1-cu.-yd. bucket, which is raised and lowered by a mechanical hoist. This hoist is driven by a V-belt from the front power take-off of the tractor. The bucket may be dumped from any point on the lift, and is tilted back 30 degrees during the first part of the lift, with resulting low spillage. The machine has a digging range of 14 inches below the track line to 56 inches above this line. (June, 1946)



Above:
The Syntron Co., of Homer City, Pa., has recently put out a new model Vibra-Flo feeder. Designated the Model "F-45," this screening grizzly feeder is said to have a conveying capacity of 200 t.p.h. The feeder itself vibrates at 3,600 oscillations per minute. A rheostat control permits the operator to equalize material feed with crusher capacity. (March, 1946)



Above:
An impact-cushioning troughing idler for belt conveyors is now being manufactured by the Chain Belt Co. of Milwaukee. Known as the "Rex Style No. 35," the idler is said to protect and greatly lengthen the life of the belt. Each roll consists of a rubber cylinder vulcanized directly to the assembly tube. The cylinder has multiple grooves moulded into it, deep primary grooves for maximum cushioning, and shallow secondary grooves to provide surface softness. (June, 1946)

Complete but condensed information on nonmetallic minerals production is contained in the statistics chapter of the Pit and Quarry Handbook.

Mr. Paul Routh (lower left), who owns the gravel plant pictured above with a Deister Plat-O Vibrating Screen similar to the one shown at the left, says: "We have here an excess of 3/16" materials which we must eliminate without overloading the screen with fines. We are doing with this one four-deck screen what normally would be done with two screens. I've never had any trouble starting it, owing to the fact that the unbalanced shaft is lubricated with a light oil. This Deister really does work for me.

A single 3′ by 8′ four-deck Plat-O Vibrating Screen, installed in April, 1946, at the Routh Gravel Plant, Zionsville, Ind., is handling up to 75 tons of material per hour. The screen "could handle twice as much if the one and one-quarter-yard bucket could deliver that much gravel to the screen," owner Paul Routh says.

"This Deister Plat-O is a better screen than any make I've seen operated," he adds, "and I look them all over before I bought."

The Routh Gravel Plant is only one of many where profits have been increased by using Plat-O Screens. Write Deister Machine Company Engineers for information on how to install this superior screen in your operation for more efficient, trouble-free, and profitable material handling.

DEISTER MACHINE COMPANY
FORT WAYNE 4, INDIANA

Above: ESCO 1½-yard heavy duty bucket operated on Bucyrus 37, digging steel slag in Republic Steel plant.

Right: bottom view of same bucket after six months on this job.

DIGGING STEEL SLAG WITH *ESCO* DRAGLINE BUCKETS

Digging up acres of compacted steel slag is as hard on dragline buckets as any job possibly can be. Yet it was done successfully by the Heckett Engineering Corporation of Butler, Pa., using *ESCO* dragline buckets.

Pieces of slag averaged over three feet in diameter. Some of the work was under water. After buckets of three other makes had broken down on this job, an *ESCO* heavy duty bucket was put into service. After working six months it is still going strong and ready for more.

Service like this is typical of *ESCO* dragline and dipper buckets. It results from sound design by practical, experienced engineers who put strength where it is needed, engineer out excessive weight.

Manganese steel castings are used for all parts subject to shock and wear, grow harder and tougher the more they work.

An *ESCO* dragline or dipper bucket will make that tough job of yours more profitable. Get full information from your nearest *ESCO* representative, or write us.

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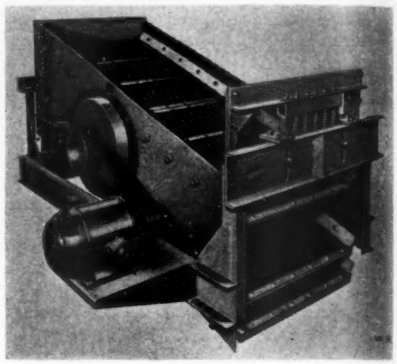
IN CANADA—*ESCO* LIMITED, 1084 Homer St., Vancouver, B. C. Telephone Marine 2343

NEW MACHINERY and SUPPLIES

● Vibrating Screen

The Telsmith "Vibro-King", a new two-bearing, heavy-duty vibrating screen especially designed for efficient wet or dry screening of sand, gravel crushed stone and ore, is a product of the Smith Engineering Works, Holton Street and Capitol Drive, Milwaukee 12, Wis. It is suitable for finished screening of aggregates passing four-inch and smaller clear square openings down to the finest mesh sizes.



Circular motion

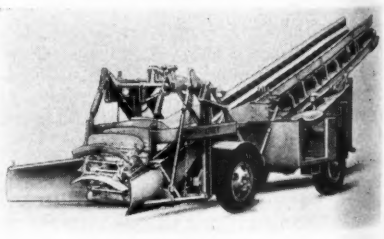
In the Vibro-King, the vibrating unit is mounted in the center of the live screen frame on two heavy-duty roller bearings and is equipped with two automatically adjusted counterweights which prevent jumping at critical speeds. The main frame is horizontal for rigidity and ease of installation, and is usually supported from below. The vibrating frame is mounted on the main frame on three nests of springs, which supply a three-point-suspension.

The Vibro-King has a circular vibration which is uniform on all parts of the screen cloth and constant under light or heavy loads. The screen can be equipped with either flat belt drive or V-belt drive.

● Force-Feed Loader

A force-feed loader, with "finger-tip" hydraulic control and many new features of design is now being sold by Athey-"Carterpillar" distributors.

The Athey Model 3 loader is made by the Athey Products Corp., 5631 W. 65th St., Chicago 38, Ill. It is used for



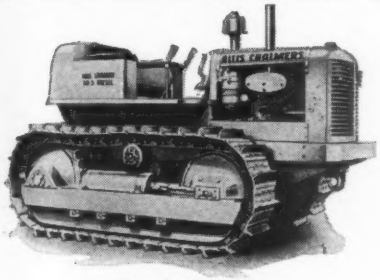
Hydraulic control

such jobs as road widening and resurfacing, ditch building and cleaning, dressing slopes and loading oil mix. It works as a companion tool for the "Caterpillar" motor grader.

With the new Finger-Tip hydraulic control, the new Model 3 provides four levers for raising and lowing the feeder, moldboard, throat ad conveyor. Other new design features include a roomy operator's platform, new conveyor and throat design, positive belt alignment, and greater loading efficiency.

• Crawler Tractor

The Tractor Division of the Allis-Chalmers Manufacturing Co., Milwaukee 1, Wis., has announced the HD-5 crawler type tractor. This machine, powered by a 37 hp. General Motors two-cycle diesel engine, is designed to fill many needs in agriculture and in the construction and building industries. It



Diesel powered

is a modern, economical unit, engineered to meet demands that have come in from the field during the past few years.

Accessible controls and convenient gear shifting arrangements that give five speeds forward, ranging from 1.46 m.p.h. to 5.47 m.p.h., tend to eliminate unnecessary operator fatigue. Easy accessibility of the clutches, transmission and engine, fewer adjusting and greasing points, and longer intervals between servicings are important features of the HD-5 that tend to simplify maintenance problems.

• Loader

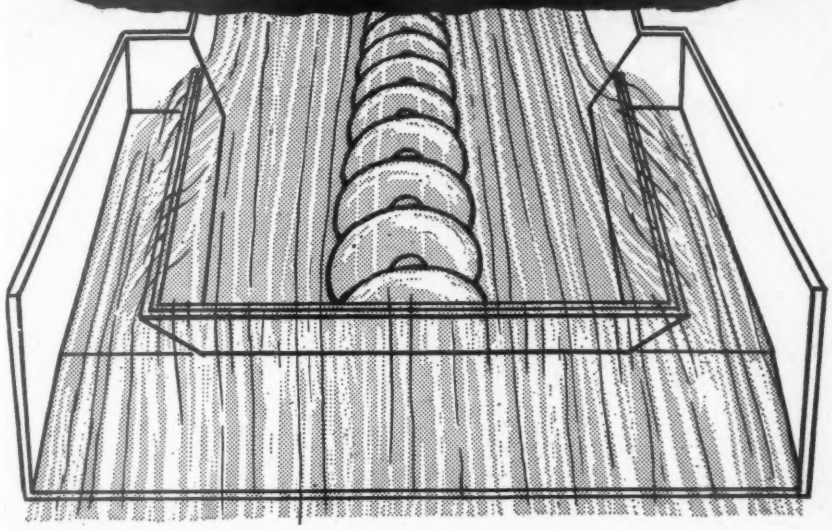
A 1947 loader, built entirely by one company, is to be offered soon by the Lessman Manufacturing Co., Des Moines, Ia. The company claims that this unit is heavier and much more durable than

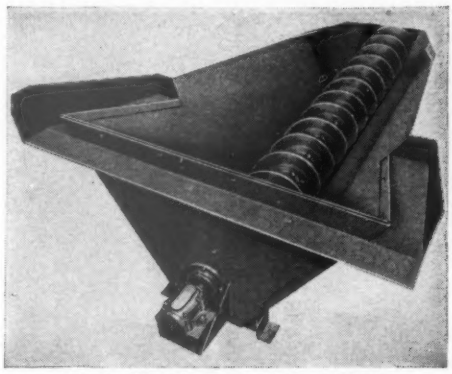
Heavy, durable

any other tractor conversion they have made.

The loader is powered by a 100-hp. motor with special gear ratios, transmissions and differentials which have been engineered to meet demands from the

DOUBLE WEIR LENGTH
with NEW EAGLE "U" DESIGN





Eagle Single Screw, Long Weir Flared Tub

Adjustable Weir Lips

Another
FIRST *for* EAGLE

Water Flows Over Discharge End and Sides

Maximum retention or desired classification of fines assured—smoother, slower, lower depth water discharge made possible with the new Eagle *long weir* for washers and classifiers. *Double* weir length with this Eagle-engineered, U-shaped design . . . no interference with settling efficiency of tub size and shape—water flows over ends and sides as shown. Weir lips slotted for vertical adjustment—raise or lower, independently, to compensate for out-of-level installation; together, to increase or decrease discharge flow. It's another development originated by Eagle for better washing and classifying—write for bulletins describing Eagle equipment for sand and gravel industry.

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133 Holcomb Ave., Des Moines, Iowa

EAGLE *Specialized Sand and Gravel Equipment*
"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS
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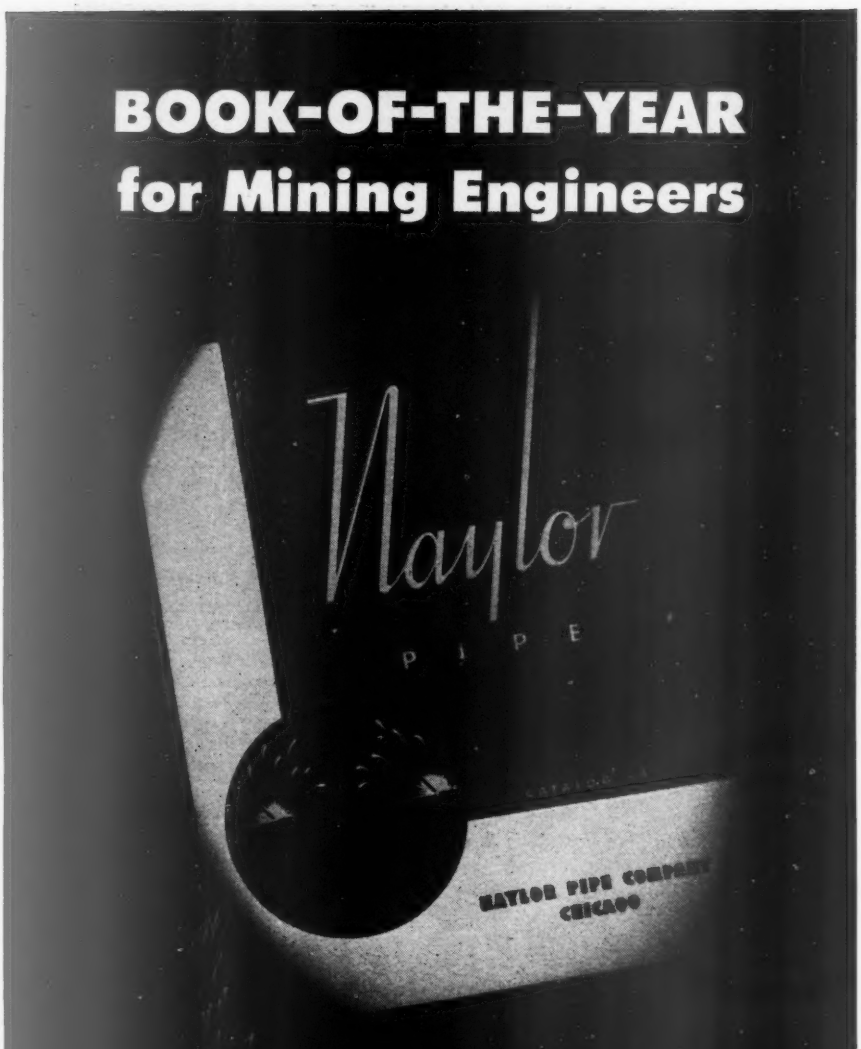
BOOK-OF-THE-YEAR for Mining Engineers



This book tells you what you want to know about the right pipe to use on applications like these: High pressure hydraulic lines, high and low pressure air lines, de-watering and drainage lines, ventilating pipe, water supply lines and sludge lines. Write for your copy today.

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SPIRALWELD PIPE

NAYLOR PIPE COMPANY
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Chicago 19, Illinois

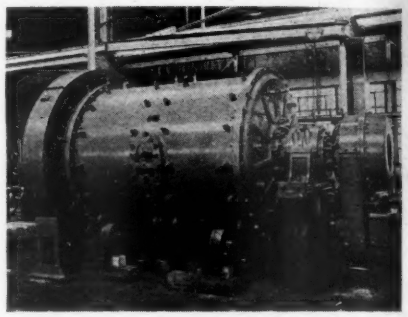
field. It has a top speed, on the road in highway ranges, of 35 m.p.h. and is equipped with hydraulic brakes and a specially sychronized clutch. Power is supplied by a front engine take-off, equipped with a 12-speed transmission.

To meet demands made by industrial users, the motor can be removed in a very short time, and the special transmission can be dropped in a matter of minutes. The differential can be removed completely if necessary, and the axles can be replaced without removing the wheels.

● Tube Mills

The Mine and Smelter Supply Co., Marcy Mill Division, P. O. Box 5270, Terminal Station, Denver 17, Colo., offers grinding mills made to order for specific grinding conditions. Ball, rod and tube mills are available. Illustrated is a new 6- by 8-foot tire-trunnion band mill.

Two 9- by 12-foot Marcy open-end



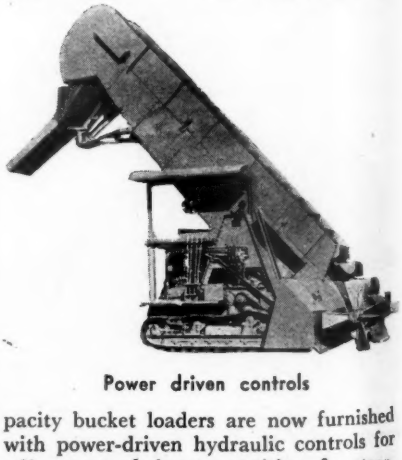
6 x 8 foot ball mill

rod mills have recently been installed in the Northwest. The company feels that this indicates a trend towards larger sizes in this type of mill as well.

Rod mill peripheral speeds are being increased in modern practice, with a resultant increase in tonnage output. Maximum speeds of 500 f.p.m. are not uncommon, with an increase of tonnage capacity of 25 to 30 percent.

● Bucket Loader

An improvement has been reported in Models 80-W, 80-C and 135 Haiss heavy-duty loaders, made by the George Haiss Mfg. Co., Inc., 381 Canal Place, New York 51, N. Y. These large, high-ca-



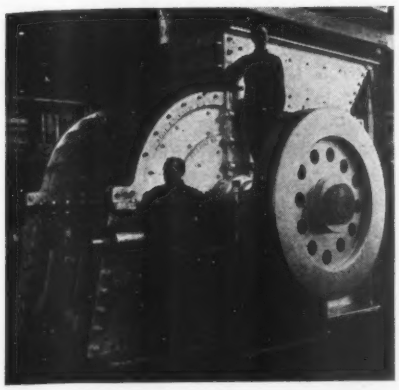
Power driven controls

pacity bucket loaders are now furnished with power-driven hydraulic controls for adjustment of elevator position, for steering brakes on tracked machines, and for

traction brakes on wheel-mounted machines.

The Model 135, illustrated, has a capacity of 6 cubic yards a minute, and is mounted on 16-inch tracks, 7 feet, 6 inches long. It is shown with extra elevator length, in operating position.

While the standard machines of the series have a discharge height of 11 feet, 4 inches, with the chute at 35 degrees, several machines have been furnished with extra elevator length.



• This large hammermill is the Number 7260 Dixie One Stage, which will reduce up to 4-yard-shovel limestone at the rate of 300 to 500 tons per hour. One cement plant reduces 3½-yard-shovel limestone to 99 percent passing ½-inch, and 72 percent passing ¼-inch, in one pass at the rate of 2400 tons per 8 hours, using an average of 320 horsepower.

• Scraper

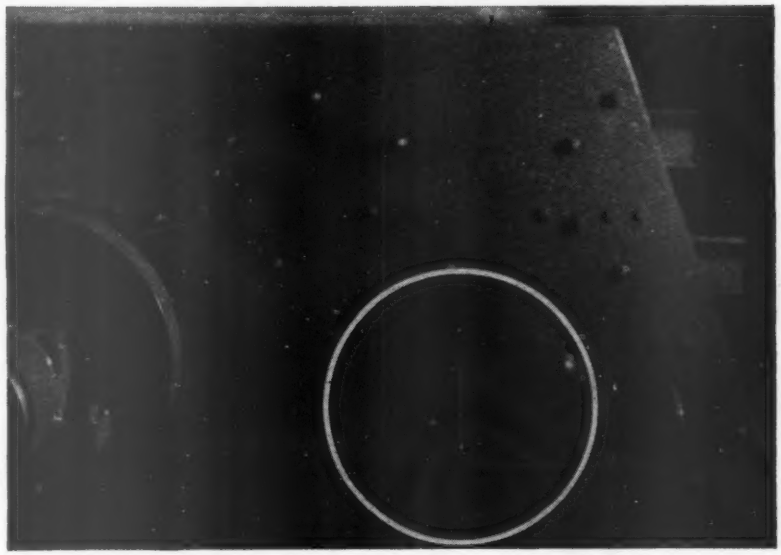
R. G. LeTourneau Inc. has just announced that production has started on a new small Tournapull. The unit is self loading and has a 3½-cubic-yard struck capacity. It is expected to be useful in stripping and working small sand and gravel pits, and it is able to pick up the material, deliver it and spread it in place. It is also expected that the new Tournapull will be used as a utility tool around quarries and gravel pits for road maintenance, drainage work and stockpiling.

• Chromium Plating

Porus-Krome, a process for plating chromium on the wearing surfaces of engine parts, is offered by the Van der Horst Corporation of America, Olean, N. Y. The process can be used to assure long life on new parts, or to build up worn surfaces on used parts. Reclaimed surfaces are said to give longer service than the original part.

Cylinder bores with ordinary chromium plating will not operate effectively as they have a tendency to "freeze." This is due to the fact that oil will not "wet" ordinary smooth chromium plating. To perform satisfactorily, the surface of the chromium must contain many fine channels, pits and valleys, which must be of just the right size, shape and character if they are to hold the lubricant where it will do the most good. The total thickness of chromium metal deposited, the amount and character of the depressions induced, and the amount that the peaks of these depressions are smoothed

No Waste Motion!



. . . with a SECO Vibrating Screen

• Contrast the drawing above with the unretouched photo of a Seco vibrating screen moving at 1050 R. P. M. Here is conclusive proof (note the pencil and washer on the base frame are unshaken) that Seco keeps all of the vibration in the live body . . . where it belongs. Note also, if you have a magnifying glass, that there are many little circles visible on the side plates. These indicate that the screen's motion is in true circles, with no distortion. No wonder operators everywhere report increased tonnages on all types of screening jobs with these dependable Seco vibrating screens. Write for "A Guide to Better Screening." Dept. A

TRUE CIRCULAR MOTION VIBRATING SCREENS

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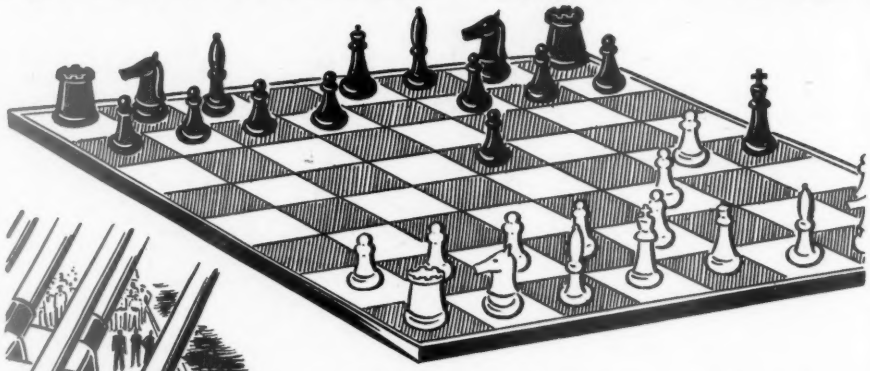
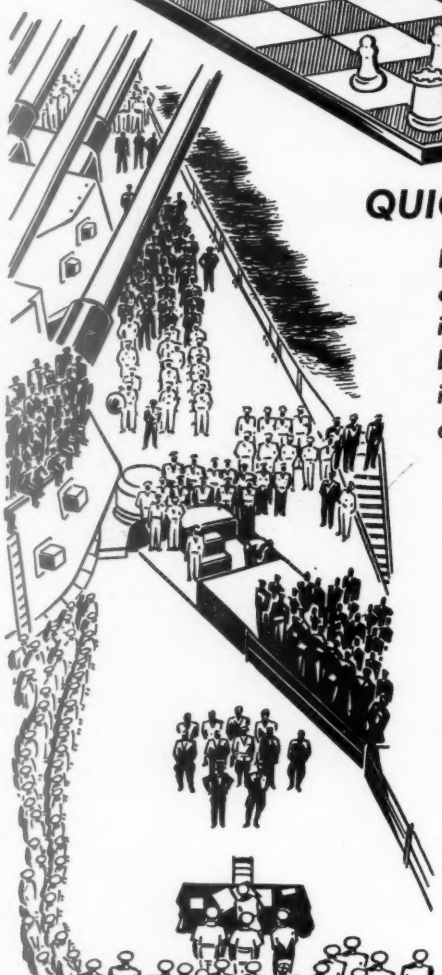
In Canada United Steel Corp., Ltd., Toronto

Famous STOPS



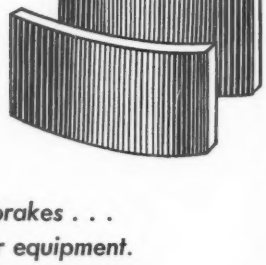
QUICK CHESS STOPPER

Four moves and the chess game is over! The so-called "Fool's Mate" is famous among chess players as being the fastest game-ender there is. In spite of its fame, it is still used as a trap for the unwary.



MOST WELCOME STOP

was the signing of the armistice that ended the war with Japan. Scene was the U. S. S. Missouri; time was September 2nd, 1945. The place, of course, was Tokyo Bay. This rates as probably the most welcome stop in modern history.



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JM PRODUCTS

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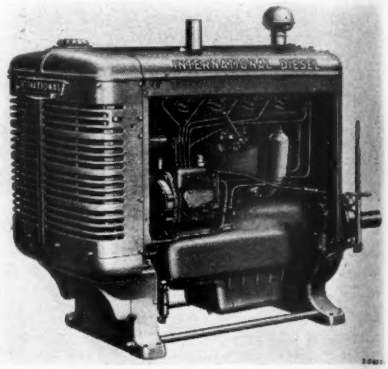
INDUSTRIAL FRICTION MATERIALS

down during final finishing, must all be carefully controlled within precise limits. If this is not done, the final surface will not pass porosity specifications.

The new porosity of the Porus-Krome changes the non-wetting characteristics of the surface so that it will hold a lubricant. This permits chromium plating to be used to advantage where the excellent corrosion resistance, low coefficient of friction and extreme hardness of the metal are an advantage. Greatly reduced wear on metal parts will result, and the life of the part will be multiplied 4 to 20 times. Piston ring life will be increased 3 to 5 times. There is apparently no limit to the number of times a cylinder can be reprocessed.



• The International UD-14A Diesel power unit now in production at International Harvester's Melrose Park (Ill.) works. This 4-cylinder, 4-cycle diesel power unit develops 76 maximum horsepower at 1400 r.p.m.

• Protective Equipment

The Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa., maker of protective equipment, offers "Skullgards" and "Comfo" respirators to furnish protection for per-

Mask and helmet

sons who work under hazardous conditions, such as quarrying and mining.

The Skullgard helmet is high-pressure molded in one piece from hard, smooth laminated bakelite composition. It will not soften, swell, or gain in weight, and

is resistant to the effects of water, oil and perspiration. The "Type K" Skullgard illustrated is extensively used for outdoor work. The broad, rigid brim sheds water and protects against falling material.

The Comfo respirator offers low breathing resistance with high filtering efficiency. Twin side placed filter cases permit unobstructed sidewise and downward vision. A new "cushion" facepiece, with a soft rolled edge, assures a quick, gas tight fit with no pressure points. A guarded exhaust valve provides low exhalation resistance. The respirator is approved by the U. S. Bureau of Mines.

• Drop Balls

Drop balls, furnished in sizes from 2,000 to 8,000 pounds, can be obtained from the Cape Ann Anchor and Forge Co., Gloucester, Mass. Used for secondary breakage, Cape Ann drop balls are forged in octagonal section, which gives

Secondary crushing

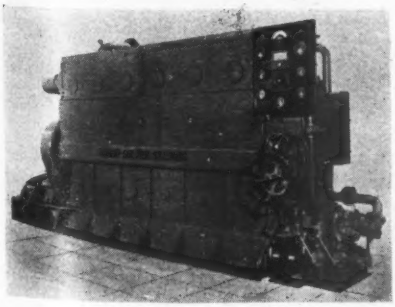
greater impact strength per square inch on the bottom of the ball than the conventional pear shaped design, according to the company.

The drop balls are forged from .40/.50 carbon steel, with the lug on top of the ball forged as an intregal part. The company is now developing a new type of rigging for attaching the hoisting cable.

A 5,500 pound ball is illustrated in action.

• Diesel Engines

Diesel engines for stationary installations are manufactured by the Busch-Sulzer Bros. Diesel Engine Co., 3300 S. Second St., St. Louis 18, Mo. Types



Six cylinder type

DF, DFT, DB and DBT engines are of the vertical, four-cycle, single acting,

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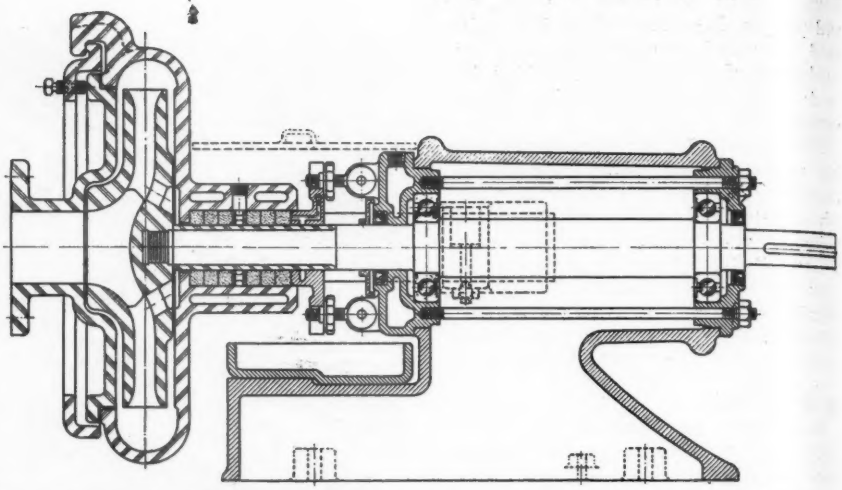
trunk piston, mechanical injection type. The DF and DB type engines are the naturally aspirated models, while the DFT and DBT models are supercharged by application of the Buchi exhaust gas-driven turbocharger.

DHB type engines are of the vertical, two-cycle, single-acting trunk piston, mechanical injection type, with roots type scavenging blowers built integrally with the engine. DHB engines range in size from five to ten cylinders, and develop from 1,700 to 3,540 BHP at 240 to 250 r.p.m.

Illustrated is a six-cylinder type DF engine, which has a 13-inch bore and a 17-inch stroke. This type engine is available in sizes ranging from four to eight cylinders, developing 300 to 660 BHP at 360 to 400 r.p.m.



Handles liquids and slurries

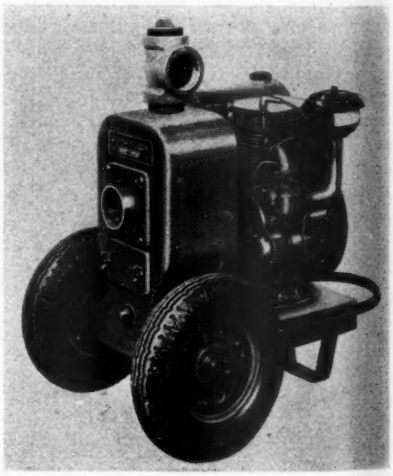
● Centrifugal Pump

The Nagle type "T" Industrial Pump is a conventional single-stage side suction unit, made in sizes 3¾-inch to 8-inches for heads up to 250 feet, in the capacity range of 2000 g.p.m.

The type "T" is intended for handling abrasive mixtures and corrosive liquids and slurries from either above or below the sump liquid level. In general the unit is supplied as shown in the section drawing. However, certain design modifications are available when operating conditions require special materials or water cooling. Various impeller types are available for the pump.

● Portable Pump

A "Blue Brute" line of portable self-priming centrifugal pumps has been put out recently by the Worthington Pump and Machinery Corporation. The company maintains that the new pumping

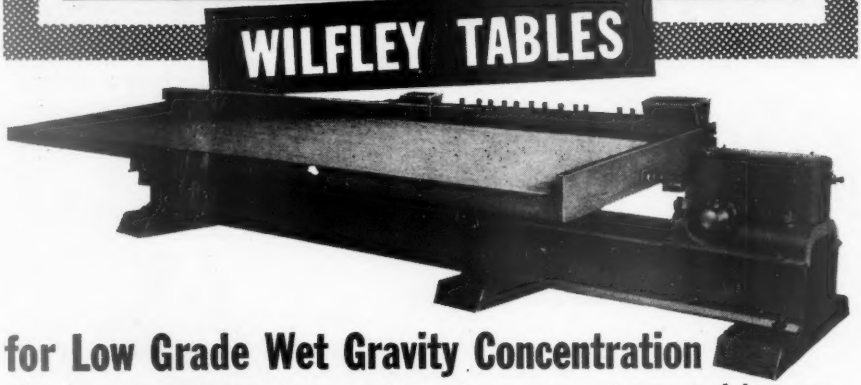


Diesel or gasoline engined

units meet the standard rating tables for this type of equipment with liberal factors of safety in both capacity and power.

The pumps are fabricated of corrosion- and abrasion-resisting steel. All sizes except the smallest (1½ inch) are regularly equipped with pneumatic tired wheels, towing handles and lifting bales. One-and-one-half-inch to 4-inch pumps are available.

WILFLEY TABLES



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1. For concentrating low grade feeds to high grade concentrate for chemical treatment and tailings.
2. Before or after flotation to recover coarse mineral not readily susceptible to flotation.
3. To separate or grade up from previous table concentrates or original table feed.
4. To concentrate middlings feed for a high grade concentrate and middlings for regrind.

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W. R. JUDSON *Santiago, Lima*

• Earth Mover

Old in excavating practice but new in transportation, the new Dixson Wagon incorporates the clamshell-bucket principle to high-speed automatic earth moving. Just introduced to the pit, quarry and construction industries, the new unit is said to be ideal for pit-to-plant transportation service, hauling overburden, etc.

The bottom of the bucket-dump body will open to an area of 6 by 16 feet, allowing boulders, sticky material and the like to be quickly discharged.

Mounted on large-diameter pneumatic tires, the new unit is offered initially with a capacity of 16 cubic yards payload. It will operate at full efficiency with either tractor or 10-ton (or larger) truck with a motor of 150-hp. or more. The dumping operation of the Dixson Wagon is cable controlled from a single drum power unit actuated by the tractor or truck transmission. Its wide wheel tread offers unusual stability, allowing operation on hilly or uneven terrain without danger of overturning.

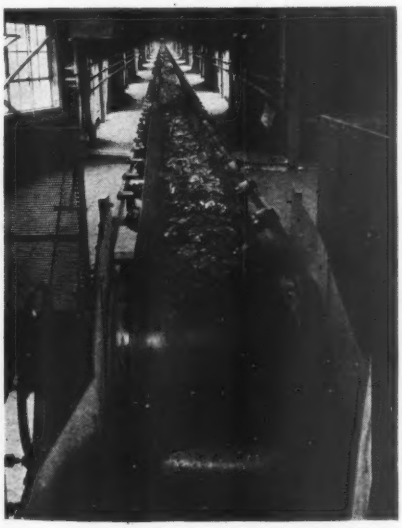
Further information regarding this newest type of hauling unit my be obtained by writing the manufacturer, Dixson Wagon, Inc., 2801 West Mission Road, Alhambra, Calif.

16-cubic-yard capacity

• Rubber Belting

Two items of interest to pit and quarry producers have been announced by Hewitt Rubber of Buffalo (a division of Hewitt-Robins Incorporated), makers of belting, hose and molded goods.

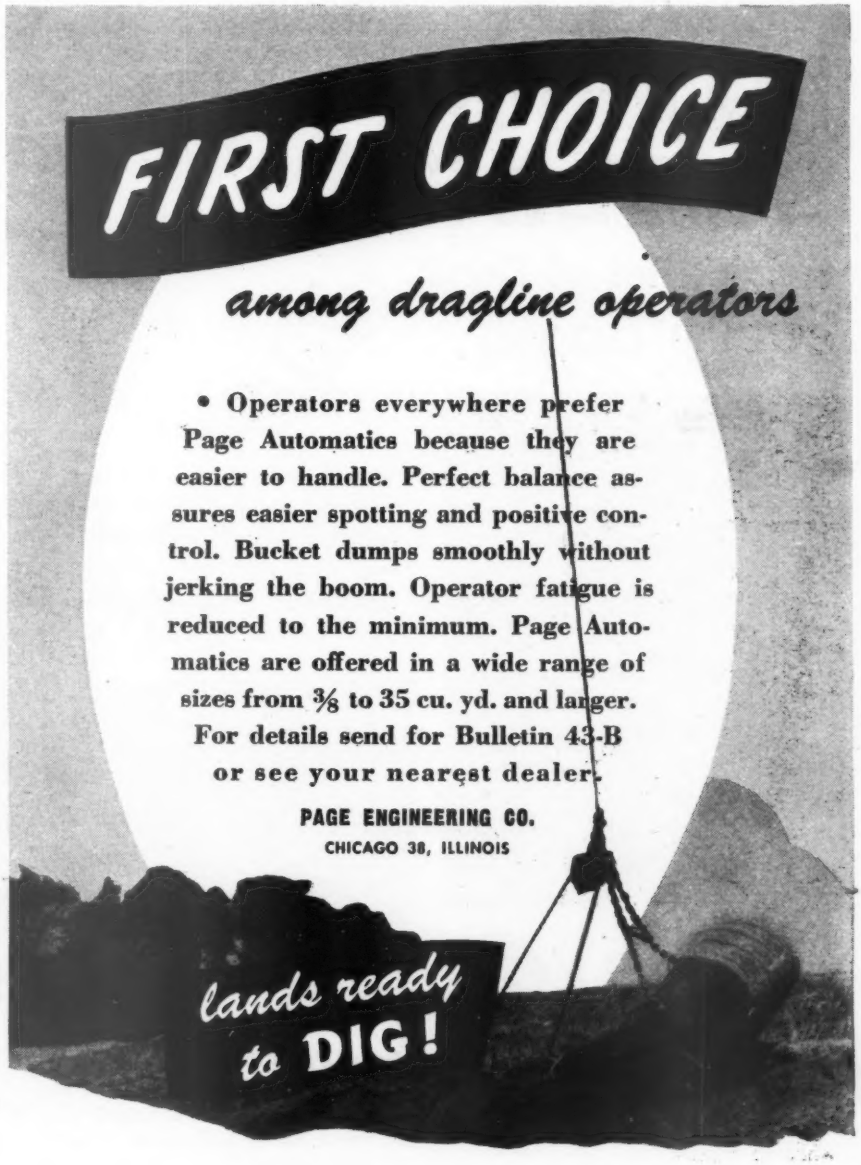
Hewitt conveyor belting is constructed of rubber compounds and cotton duck, with plies laid straight under tension.



Abrasion resistant

The tough rubber cover protects the inner structure of the belt against penetration by deteriorating materials, and provides resistance to abrasion and cutting.

Hewitt elevator belting is constructed in essentially the same way. A durable rubber cover completely encloses the belt carcass, providing a high degree of resistance to the tearing tendency of bucket bolts.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• Operators everywhere prefer Page Automatics because they are easier to handle. Perfect balance assures easier spotting and positive control. Bucket dumps smoothly without jerking the boom. Operator fatigue is reduced to the minimum. Page Automatics are offered in a wide range of sizes from 3/8 to 35 cu. yd. and larger. For details send for Bulletin 43-B or see your nearest dealer.
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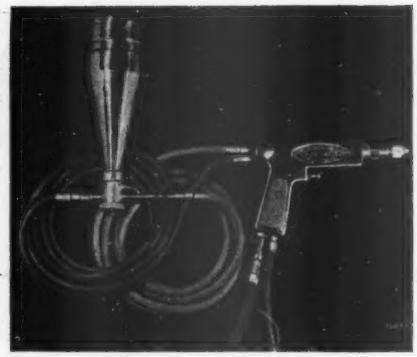
● Metallizing Process

The Colmonoy "Spraywеld" process combines the advantages of welding and metallizing, using a "Spraywelder" and Colmonoy powdered hard facing alloys. The "Spraywelder" gun, made by the Wall Colmonoy Corp., 714 Fisher Bldg., Detroit 2, Mich., is furnished complete with hopper and hoses. Four valves are used for oxygen, acetylene, air and metal powder.

When an area is to be spraywelded, it is first grit-blasted, and then an overlay of Colmonoy is applied. This alloy has several unusual properties: a high resistance to oxidation at elevated temperatures, remarkable metal wetting properties when molten, and most important for this purpose, a high plastic range. This



Hopper, hoses and gun

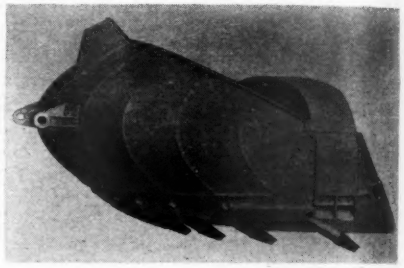
means that the metal remains solid below a temperature of 1850 degrees F., and above this it becomes plastic or mushy. It remains plastic until a temperature of approximately 2050 degrees F. is reached, when it becomes too fluid for this use.

When heat is applied after spraying fusion takes place, and the fine particles of sprayed metal melt to form a dense, hard layer.

● Scraper Buckets

Largest of the Crescent scraper buckets manufactured by Sauerman Bros., Inc., 534 South Clinton Street, Chicago 7, Ill., is the new 15-cubic-yard Crescent "Mammoth," now in use for open pit mining, stripping, levee construction, and similar work.

Because of refinements in cutting lines, and because of its reduced weight-strength ratio, the 15-cubic-yard Crescent Mammoth can be operated by a power



15-cubic-yard capacity

unit scarcely larger than was required for former Crescent scrapers of 12-cubic-yard capacity.

Like all Crescent scrapers, the Mammoth is mathematically designed for maximum penetrating power and strength with minimum weight, and takes advantage of the latest metallurgical developments.

● Truck Tire

Production of the Road Lug truck tire in sizes 7.00x20 through 12.00x24 has begun in Goodyear Tire and Rubber Co. factories, and ultimately sizes 13.00x24 and 14.00x24 will be made available.

The Road Lug is particularly suitable for use in such services as quarrying, and strip mining under conditions where heavy loads must be hauled out on rocky, rutty or stump-obstructed roads to surfaced highways for long hauls to the ultimate destination.

The Road Lug tire was designed to resist cutting and bruising, prove traction in soggy going in addition to deliver exceptional mileage on improved highways.

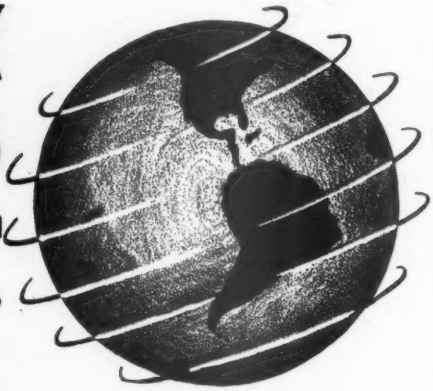
● Convertible Crane

The General Excavator Company's Type 10, Model 105 "Mobilcrane" is a one-man machine which is readily convertible into a shovel, dragline, clamshell or pushshovel.

Automotive type transmissions and differentials permit flexibility in starting, stopping, working and traveling. A heavy-duty, four-speed transmission allows speeds of more than 20 m.p.h. All four wheels are equipped with air brakes. General Excavator Co. is located in Marion, O.

MERRICK SCALES

weigh a lot of Earth *every day . . .*



Around the world, wherever bulk materials are handled on belt conveyors, much of the weighing and recording work is entrusted to MERRICK SCALES—standard precision units for more than 35 years.

MERRICK WEIGHTOMETER

furnishes a constant, automatic, accurate record of material weights while in transit.

It features easy installation, long dependability regardless of working conditions, and high operating economy.

MERRICK Feedoweight

Quality production in many plants in the Chemical Process Industries is guaranteed with Feedoweights. Used to accurately weigh and feed materials (by weight) into process with adequate safeguards to prevent errors.

Write for Information

MERRICK SCALE MFG. CO. 188 AUTUMN STREET PASSAIC, NEW JERSEY

Non-metallic bushings and washers made of this new plastic material

• Bearing Material

Several pilot applications of "Ryertex" bearings in the nonmetallic minerals industry are now being studied by Joseph T. Ryerson & Son, Inc., P. O. Box 8000-A, Chicago 80, Ill.

Ryertex bearings reportedly have been successfully used in paper mills, steel mills, cement mills and marine applications, but due to scarcity of materials and the engineering problems involved, other fields have not been exploited.

These bearings are nonmetallic, in that they are made from a strong tough textile saturated with a synthetic resin. Water alone may be used as a lubricant, or water mixed with oil, or oil or grease alone can be used. Ryertex lubricated with water develops about one-third of the friction developed with oil-lubricated babbitt, and about one-fifth of the friction developed by water-lubricated babbitt. The material will sustain a crushing strain of 32,000 pounds p.s.i., and has extreme surface hardness, whch gives it a very low coefficient of friction.

Under overload, Ryertex will not score the shaft. The worst that can happen is a carbonizing of the surface fabric, which gives out a pungent distinct odor, and merely results in more rapid bearing wear.

IT COSTS NO MORE TO USE THE BEST

REPLACE WITH "Indian Brand"

Shovel Dippers
Dipper Teeth
Shovel Treads

Crusher Jaw Plates
Mantles—Concaves
Bowl Liners
Roll Shells

Pulverizer Hammers
Grate Bars—Breaker Plates

Ball Mill Liners
Screen Plates

The Frog, Switch & Mfg. Co. CARLISLE, PA.

ESTABLISHED 1881

FASTER LOADING, LIFTING, SCRAPING

The Ottawa INDUSTRIAL HYDRAULIC FRONT END LOADER

"The Ottawa" INDUSTRIAL Hydraulic Front-End Loader saves hundreds of man hours on every job. A rugged heavy duty attachment for industrial type tractors that loads bulk materials, does light bulldozing jobs and operates as a portable crane. A year round labor saver—will do hundreds of odd jobs better faster. Bulldozer, Boom and Snow Plow attachments available to give you maximum productive use of your industrial tractor.

Fits most models of industrial tractors. Write today for prices and illustrated bulletin. IMMEDIATE SHIPMENT.

OTTAWA STEEL PRODUCTS, INC.
OTTAWA, KANSAS

DRILL without DUST

KADCO EQUIPMENT Reduces Costs Eliminates Hazard

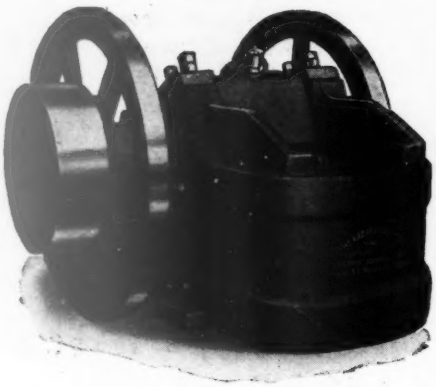
Use KADCO Dust Control equipment on your rock drills for greater drilling footage—less blacksmithing—longer tool life—better working conditions. Available in a wide range of sizes for all operations. For sale or lease.

Write for Information

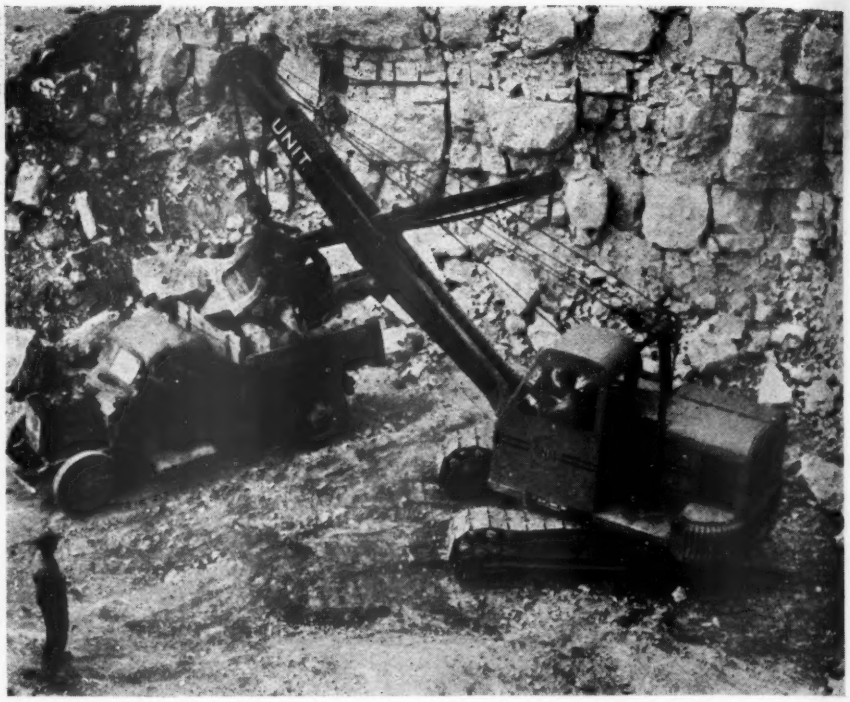
KADCO CORPORATION
LONG ISLAND CITY, N. Y.

FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service.



FARREL-BACON
ANSONIA, CONNECTICUT



360-degree vision

● Self-Propelled Shovel

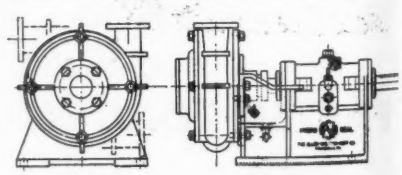
The Model 1020 ¾-cubic yard shovel manufactured by the Unit Crane and Shovel Corp., Milwaukee 14, Wis., is designed for quick conversion into a crane, trench-hoe, clamshell, dragline or pile driver. It is equipped with a heavy-duty industrial gasoline engine, rated at 80 hp. at 1600 r.p.m. A one-piece precast gear case encloses all operating parts and permits them to run in a continuous bath of oil.

All gears and shafts are splined, drop-forged alloy steel, heat treated and closely machined and ground for accuracy. All shafts are mounted on anti-friction bearings. Disc type clutches further assure smooth an easy operation. Automatic traction brakes are self-engaged by spring action, providing a friction type locking device for both crawlers. The brakes are automatically released when power is applied. The Unit full vision cab gives the operator 360-degree clear vision. Shatterproof glass provides safety and increases operating efficiency.

● Abrasives Pump

Improvements have recently been made in the Hydroseal abrasive-materials-handling pump, a product of the Allen-Sherman-Hoff Co., 1437 Locust St., Philadelphia 2, Pa.

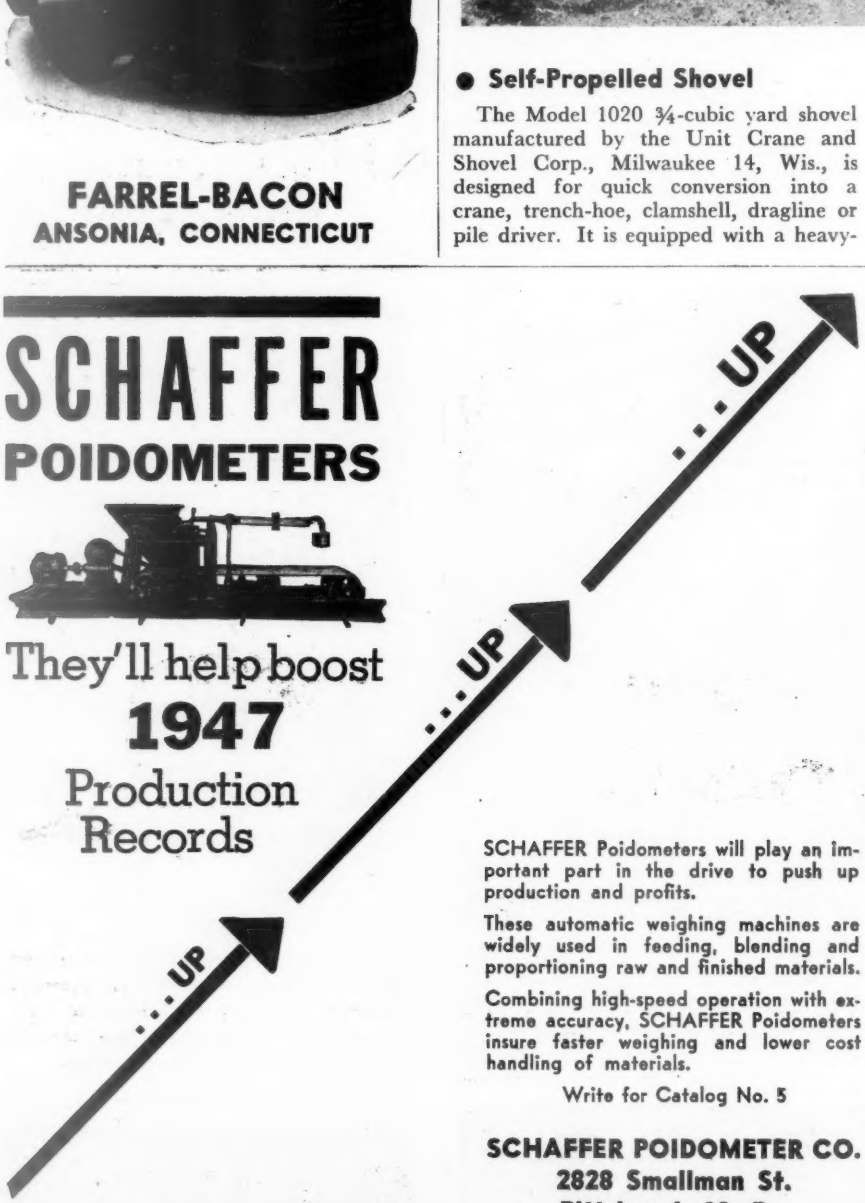
Heavy duty anti-friction radial and thrust bearings are now standard equipment, and both pump shell and engine side bell are now supported from the bearing housing. This permits the pump discharge to be placed at any of the three positions indicated in the illustration, eliminating the necessity for special construction and, in many cases, simplifying the installation of discharge piping.



Three position discharge

SCHAFFER POIDOMETERS

They'll help boost **1947** Production Records



SCHAFFER Poidometers will play an important part in the drive to push up production and profits.

These automatic weighing machines are widely used in feeding, blending and proportioning raw and finished materials.

Combining high-speed operation with extreme accuracy, SCHAFFER Poidometers insure faster weighing and lower cost handling of materials.

Write for Catalog No. 5

SCHAFFER POIDOMETER CO.
2828 Smallman St.
Pittsburgh 22, Pa.

TRADE NOTES

Nordberg Manufacturing Company announces the appointment of B. T. Eagerton as export manager. He has been associated with exporting since 1928 and came to Nordberg from the Oliver Corporation, where he served as assistant manager of the export division.

B. T. Eagerton

Prior to that Mr. Eagerton was export manager for the Cleveland Tractor Company, which was later absorbed by the Oliver Corporation. His headquarters will be at the main office of Nordberg at Milwaukee.

Sydney G. McAllister, 67, former president of the International Harvester Company (1935 to 1940), died on December 25 in Pasadena, Calif., after an illness of several months. Upon resigning from the presidency of International, Mr. McAllister became chairman of the executive committee of the directors, a position he held until May, 1946.

The appointment of Dan J. Sheehan as manager of the Danville, Ill., plant of the Hyster Company was announced recently by Frank L. Ross, Eastern division manager.

D. J. Sheehan

Mr. Sheehan was superintendent of motive power for the Chicago and Eastern Illinois Railroad in Danville for the last 14 years. He had previously been an instructor in mechanical engineering courses at Purdue University.

Philip C. Talbot has been appointed manager of the newly-opened Philadelphia office of the Reeves Pulley Company of Columbus, Ind., located in the Wilford Building, 33rd and Archer streets.

P. C. Talbot

Mr. Talbot will be assisted by William A. McCosh. Both have been connected with the sale of Reeves variable speed control equipment for several years.

Investigate

this MODERN Core-Drilling Machine

It's Engineered to Meet Your Most Severe Demands

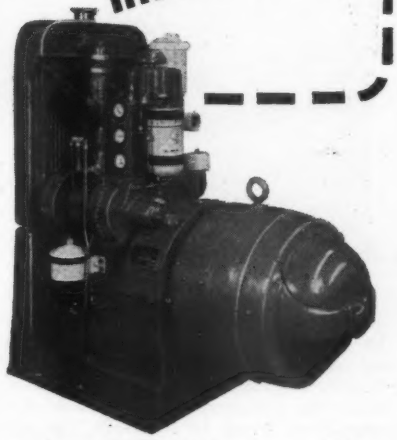
Sprague & Henwood Core Drilling Machines are modern in every respect . . . can EASILY perform the work expected of them! That's because they are built to meet the demands of present day core drilling work! The machines are high speed, exceptionally sturdy constructed to withstand rugged service. Available with two distinct types of feeds, "Screwfeed" and "Hydraulic," according to the type of swivel head selected. Have many exclusive features. Write today for full details.

Bortz DIAMOND BITS are also manufactured by Sprague & Henwood. Full details sent upon request.

SPRAGUE & HENWOOD, Inc.

Dept. K — SCRANTON, PA., U. S. A.

I can count on my Sheppard Diesel Econolectric plant for steady-voltage power . . . free from outside interference



But dependability is just one of the many advantages of Sheppard Diesel power. Write for our completely illustrated booklet and see why a Sheppard is so simple and economical to operate.

R. H. SHEPPARD COMPANY, INC.
13 Middle St., Hanover, Pa.

Generating Sets—2,000 to 36,000 Watts
Power Units—3¾ to 56 Continuous H. P.

DIESEL'S THE POWER . . .

Sheppard's the Diesel

GILSON Mechanical Testing Screen

Gives You Fast Accurate Sizing of Test Samples

- Crushed Stone
- Gravel
- Slag
- Similar Materials

The GILSON Testing Screen handles a large and representative sample in three to five minutes. Compact smooth operating unit is designed for testing and research over a wide range from 4-inch to 200-mesh. An attachment for testing sand is optional. You need this practical method of plant control.

8 GILSON FEATURES

1. Makes tests quickly and accurately.
2. Two to seven separations simultaneously.
3. One machine for the entire size range.
4. Screen trays independently removable.
5. Trays adjusted to same tare weight.
6. Visible separation to refusal.
7. Few moving parts to wear out.
8. Engineered for long and practical service.

Write for bulletin and complete details.

GILSON SCREEN CO.
BOX 186 MERCER, PA.

William M. Hufnagel has been named to take charge of Link-Belt's new sales office in Milwaukee. The address is the Century Building, 808 North Third Street.

W. M. Hufnagel

Mr. Hufnagel joined the Link-Belt staff in 1924. He has been serving as Chicago district sales engineer since 1943. Assisting him in the new sales office at Milwaukee will be H. B. Johnson and F. E. Sweeney.

J. T. Myers

The election of J. T. Myers as vice-president in charge of sales and production of the Davey Compressor Co., Kent, O., was announced recently by Paul H. Davey, president.

Mr. Myers has been a member of the Davey organization for the past five years. During World War II he served as engineering officer aboard a mine sweeper in the Atlantic, later on special assignment to the naval engineering laboratories at Annapolis. For the past year, Mr. Myers has served as assistant general manager of the Davey Compressor Co.

Link-Belt Speeder Corporation, Cedar Rapids and Chicago, manufacturers of a complete line of crawler and wheel-mounted shovel cranes, announce the election of David W. Lehti as president, effective January 1, 1947, to succeed Troy M. Deal, who retires on March 1, 1947.

D. W. Lehti

Mr. Lehti first became associated with Link-Belt as a distributor in 1925. He joined the Speeder corporation as a district representative in 1934 and, after a few months, was made chief engineer of the Cedar Rapids plant.

Troy M. Deal became associated with the Speeder corporation in 1922, when it was located in Fairfield, Iowa. With G. T. Ronk, the founder, and Walter Baker he helped to develop this young company. He was sales manager from the beginning and, in 1933, became president and general manager. In 1939, he became president of Link-Belt Speeder Corporation.

The corporate name of the American Foundry Equipment Company of Mishawaka, Ind., has been changed to the American Wheelabrator & Equipment Corporation, effective November 15, 1946.

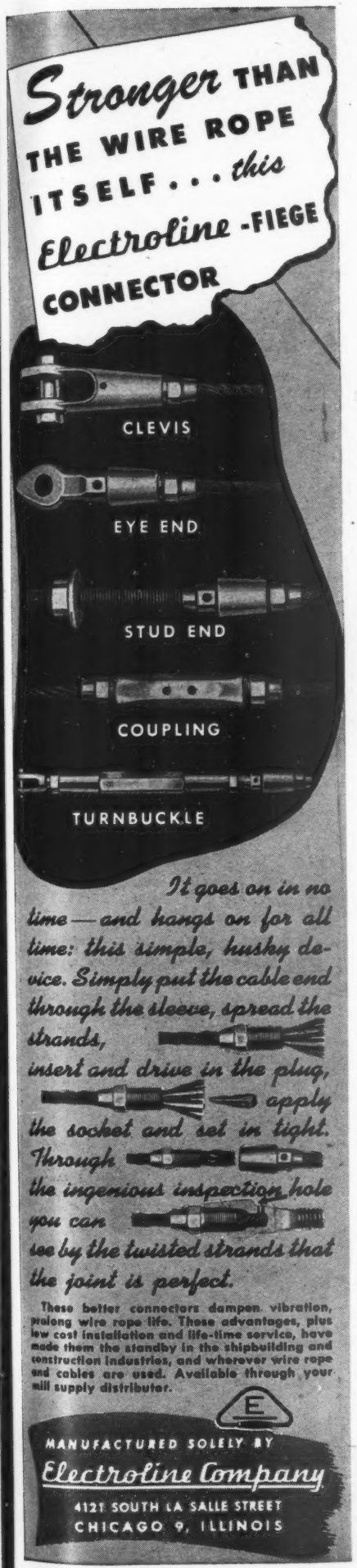
WISCONSIN Air-Cooled Engine Powers "Donkey Pack" Portable Pumping Unit

Typical of the many diversified applications of Wisconsin Air-Cooled Engines in engineering service is the unit here illustrated . . . designed for use in the Andes Mountains of South America, for pumping drilling mud on a geophysical shot hole drilling rig. It is so designed and constructed that it can be readily disassembled in three sections and transported by donkeys. A structural aluminum frame was used . . . and a Model AEH 4-cycle, single cylinder Wisconsin Air-Cooled Engine was selected for operating the Model B4-4 Moyno Pump . . . based on such vital considerations as light weight, extreme compactness, heavy-duty dependability and complete adaptability to trouble-free operation in any locality, at any altitude.

It pays to specify "Wisconsin Engine" for *your* equipment.

Most H.P. per pound

WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines


Stronger THAN THE WIRE ROPE ITSELF . . . this Electroline-FIEGE CONNECTOR
CLEVIS
EYE END
STUD END
COUPLING
TURNBUCKLE
It goes on in no time—and hangs on for all time: this simple, husky device. Simply put the cable end through the sleeve, spread the strands, insert and drive in the plug, apply the socket and set in tight. Through the ingenious inspection hole you can see by the twisted strands that the joint is perfect.
These better connectors dampen vibration, prolong wire rope life. These advantages, plus low cost installation and life-time service, have made them the standby in the shipbuilding and construction industries, and wherever wire rope and cables are used. Available through your mill supply distributor.
MANUFACTURED SOLELY BY
Electroline Company
4121 SOUTH LA SALLE STREET
CHICAGO 9, ILLINOIS

The Four Wheel Drive Auto Company of Clintonville, Wis., has announced the following appointments:

A. R. Krug has been made zone sales manager for the states of Tennessee, Alabama, Florida, Georgia, South Carolina and North Carolina.

A. P. Krug

William C. Merrill has been named zone sales manager for Texas, Oklahoma, Arkansas, Louisiana and Mississippi. He has been district sales supervisor in this territory, with headquarters at Duncan, Okla.

P. M. Schmidt is western states sales zone manager at the new sales headquarters in the Newhause Building, Salt Lake City. This territory covers California, Nevada, Arizona, Utah, New Mexico, Colorado, Wyoming, Montana, Idaho, Oregon and Washington.

Roy K. Ferguson, president of the St. Regis Paper Company, announced today the election of seven new officers of the St. Regis Sales Corporation, the company's sales subsidiary. They are: Mason F. Ford, executive vice-president and South American manager; Thomas R. Cosford, executive vice-president and Canadian manager; Reginald L. Vayo, executive vice-president and director of sales of Kraft pulp; William H. Anders, executive vice-president and manager of the Nashua River division; Edgar Hoppe, vice-president and European manager; Burton A. Ford, vce-president, Multiwall Bag division; and C. A. Brothman, comptroller.

E. J. Schwanhausser, vice-president of Worthington Pump & Machinery Corporation, was re-elected president of the Diesel Engine Manufacturers Association at the association's annual meeting held December 11 at Chicago.

Also returned to their posts as vice-presidents of the association were J. E. Peterson, vice-president of General Machinery Corporation, and Gordon Lefebvre, president of Cooper-Bessemer Corporation. Robert H. Morse, Jr., vice-president and general sales manager of Fairbanks, Morse & Co., was again chosen to serve as treasurer.

The executive committee of Machinery and Allied Products Institute has announced the election of Alexander Konkle of Chicago as its executive vice-president. Mr. Konkle first became identified with the institute in 1934 and served as its secretary through 1940. At that time he became executive vice-president of Kelly Steel Works of Chicago. During these six years Mr. Konkle also continued his association with M.A.P.I. as assistant treasurer.

"Cape Ann"
FORGED
STEEL DROP BALL

A **FORGED** Steel Drop Ball of rugged design engineered to give greater efficiency for economical secondary breakage!

2000 to 8000 lbs.

Deliveries prompt.

For further information write—

Cape Ann Anchor & Forge Co.
Gloucester - Massachusetts

A HOOK *that* CAN'T LOSE ITS LOAD

The newly-designed latch (with stainless steel spring) gives Laughlin's unique Safety Hook a 25%-40% wider throat opening.

Don't chance accidents up above. Laughlin's Safety Hook keeps loads under control even if jolted in mid-air

They are made of drop-forged steel, heat-treated. They're rugged. Get the details on these hooks with the improved type of latch.

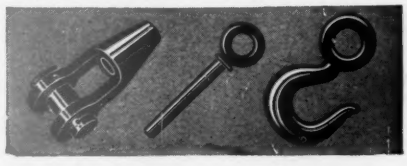
OTHER LAUGHLIN HOOKS

Laughlin offers the most complete line of hooks, including grab hooks, hoist hooks, cargo hooks and other types, all heat-treated, drop-forged and weldless.

Distributed through mill, mine and oil field supply houses. For catalog, write Dept. 3, The Thomas Laughlin Company, Portland 3, Me.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



The Independent Pneumatic Tool Company of Chicago, manufacturer of Thor portable pneumatic and electric tools, announces a $1,000,000 expansion of its main works at Aurora, Ill. The site for the expansion is adjacent to the company's main plant, according to Neil C. Hurley Jr., president, and construction of the annex, which will provide 85,000 square feet of additional floor space for production purposes, will begin shortly.

Mr. Hurley further announced that the expanded facilities are planned for production of new Thor products including electric saws, high frequency electric tools, pneumatic hammers, valve refacers and hard seat grinders.

Joseph T. Ryerson & Son, Inc., has recently completed a new office building at Pittsburgh which was designed and engineered to provide working space to assure speed and efficiency in handling and dispatching orders. It is located at Arch Street and Bell Avenue.

•The new office building of Joseph T. Ryerson & Son, Inc.

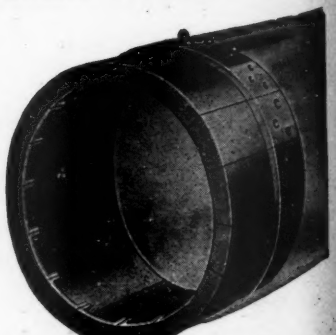
KILN END *Burn-Outs* KILL PROFITS

PYRASTEEL KILN ENDS

... prevent costly burn-outs and shutdowns that result in serious loss of production.

Install PYRASTEEL Segmental Kiln End at *both* the discharge and feed ends of your cement kilns, and be assured of long, dependable, and economical service.

Write for Bulletin of This Heat-Resisting Alloy



Showing discharge end of cement kiln fitted with PYRASTEEL Segmental Kiln Ends.

Unit Segments are easy to Install or replace.

CHICAGO STEEL FOUNDRY COMPANY

KEDZIE AVE. & 37TH ST.

PYRASTEEL for high temperatures

CHICAGO 32, ILL.

Makers of Alloy Steel for 30 Years

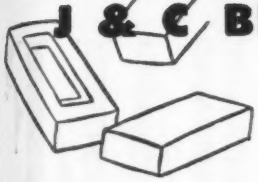
EVANSTEEL for strength

January, 1947

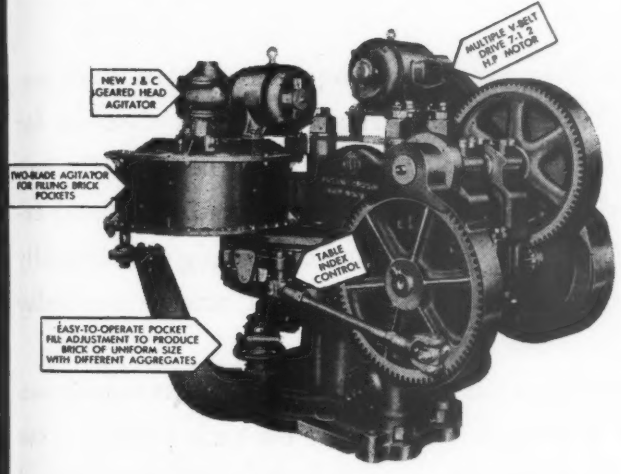
The CONCRETE MANUFACTURER

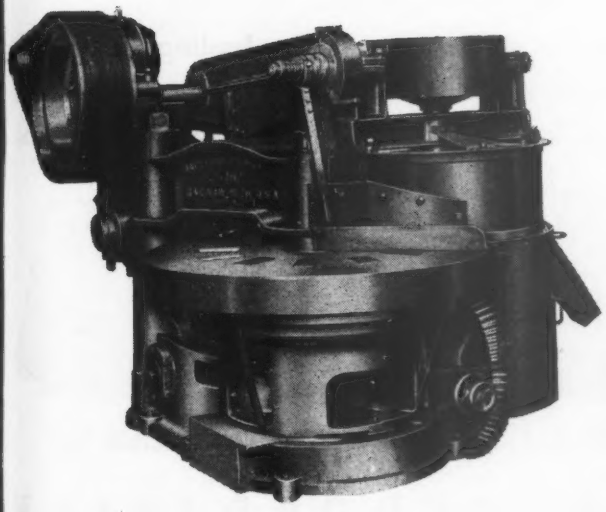
Special Section of ...

J & C BRICK MACHINES TURN OUT MORE AND



Better Brick . . FASTER AND EASIER


MULTIPLE V-BELT DRIVE 7½ H.P MOTOR
NEW J & C GEARED HEAD AGITATOR
TWO-BLADE AGITATOR FOR FILLING BRICK POCKETS
TABLE INDEX CONTROL
EASY-TO-OPERATE POCKET FILL ADJUSTMENT TO PRODUCE BRICK OF UNIFORM SIZE WITH DIFFERENT AGGREGATES



You can get up to 14,000 high quality sand lime or concrete brick per 8-hour shift with the new J & C Model NC Brick Machine (left). Utilizing 75-ton pressure in a continuous molding cycle, the Model NC turns out either solid or frog-type brick with clean, sharp edges—square corners —smooth faces free from blemishes—the kind of brick contractors demand because it enables masons to lay up strong, good-looking walls in record time. No pallets are necessary. Six hardened steel lined pockets, easily adjusted in depth. Low-cost flat deck platforms. Automatic feed control from hopper to agitator. Modern geared head design.

Similar in principle to the Model NC but built for double the production, the new and improved J & C Model A Brick Machine (lower left) produces up to 28,000 brick per 8-hour day. That's approximately 60 brick per minute—one a second!—and every one is formed clean, sharp-edged, and free from blemishes by the unusually high pressure applied to the aggregate in the 12 pockets.

For faster, easier production of better brick at minimum cost, it will pay you to investigate J & C Brick Machines. Write for particulars.

JACKSON & CHURCH CO.
SAGINAW, MICHIGAN

WORK WELL DONE SINCE '81

HERE'S WHY THEY ASK FOR 'INCOR'

'INCOR' CUTS WINTER COSTS IN HALF

EACH year more and more Ready-Mix Plant customers ask for 'Incor' 24-Hour Cement for cold-weather concreting. That's because 'Incor', America's FIRST high early strength Portland cement, has made year-around concreting economically feasible. And savings with 'Incor' are greater today than ever before.

Consider what it means at today's costs to save two days' heating fuel and labor on each pour . . . cut form and tarpaulin costs in half . . . reduce overhead through earlier completion.

Another sound reason why leading Ready-Mix operators make 'Incor'* concrete available at all seasons, as part of their good service. *Reg. U. S. Pat. Off.

LONE STAR CEMENTS COVER EVERY CONSTRUCTION NEED

LONE STAR CEMENT CORPORATION

Offices: ALBANY • BETHLEHEM, PA. • BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS • JACKSON, MISS. KANSAS CITY, MO. • NEW ORLEANS • NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D.C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE CF THE WORLD'S LARGEST CEMENT PRODUCERS: 15 MODERN MILLS, 25,300,000 BARRELS ANNUAL CAPACITY

The CONCRETE MANUFACTURER

JANUARY, 1947

Vol. 10 No. 7

A MAGAZINE DEVOTED TO PRODUCTION OF CONCRETE PRODUCTS AND READY - MIXED CONCRETE

ECA

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Concrete Masonry Makers Urged to Aid Training Plan Aimed at Labor Shortage

A number of firms and organizations met in Washington recently at the invitation of the Structural Clay Products Institute, which has set up an extensive program for apprenticeship training for masons.

Approval of such training was expressed at the meeting by representatives of the Gypsum Association, the National Concrete Masonry Association, the National Lime Association, the Portland Cement Association and the Louisville Cement Company of Louisville, Ky.

About 250 local programs have been set up throughout the country. It is estimated that since the end of the war more than 6,500 apprentice masons have begun training, but thousands of additional workers must be prepared to handle masonry products, experts have stated. They foresee a serious shortage of skilled labor in this field, unless the training program receives the full support of all manufacturers of masonry products.

Illinois Operator Plans Output Of 15,000 Units per Day

Joseph D. Romano, operator of the Acme Concrete Products Company of Joliet, Ill., reports that construction of the firm's plant is now under way and that equipment for the manufacture of concrete brick has been received.

The initial capacity of the plant, equipped with Dunbrik machinery, will be about 6,000 units per day; but this figure is to be stepped up to 15,000 per day by next summer. Future plans call for the production of drain tile and precast joists and floor slabs.

Mr. Romano, who owns the business in joint partnership with Mrs. Romano, was formerly employed as a construction engineer with the John A. Zelke Engineering Company of Joliet.

Perlite Seen as Promising Lightweight Concrete Material

Perlite, a rock formerly regarded as of little industrial value, may play an important role in meeting critical postwar requirements for durable lightweight building and insulating materials, according to a publication released by the U. S. Bureau of Mines.

Resembling pumice in petrologic structure, perlite is a siliceous volcanic glass containing water of constitution which on quick heating yields an expanded product, the publication prepared by Oliver C. Ralston, Assistant Chief of the Bureau's Metallurgical Branch, reveals. Because of its lightness, durability, and superior heat- and moisture-resistance properties, expanded perlite has been utilized in increasing quantities on the Pacific coast in such important industrial uses as lightweight concrete aggregates, thermal and sound insulation, refractory brick and ceramics. Recent discoveries of extensive perlite deposits in the southwestern area of the United States have further stimulated interest in this mineral.

Although perlite is a comparatively new product, preliminary laboratory tests conducted by the Bureau indicate that it is capable of competing successfully with such minerals as exfoliated vermiculite, pumice, bloated-clay granules, and others, the publication states. In addition, known perlite deposits are relatively accessible to the principal consuming areas in the Western states.

A free copy of the publication, Information Circular 7364, "Perlite, Source of Synthetic Pumice," may be obtained by writing to the Bureau of Mines, Department of the Interior, Washington 25, D. C.

Time to Make Reservations For N.R.M.C. Assn. Meeting

Vincent P. Ahearn, executive secretary of the National Ready Mixed Concrete Association, has issued his call to members of the association planning to attend the seventeenth annual convention in Los Angeles to make their hotel reservations early.

Coming Events

February 17-18, 1947 — Chicago. 41st annual convention, Sand-Lime Brick Association, Hotel Sherman.

February 17-20, 1947 — *Chicago.* Annual meeting and exhibit, National Concrete Masonry Association, Hotel Sherman.

February 24-26, 1947—St. Louis, Mo. 39th annual national convention, American Concrete Pipe Association, Statler Hotel.

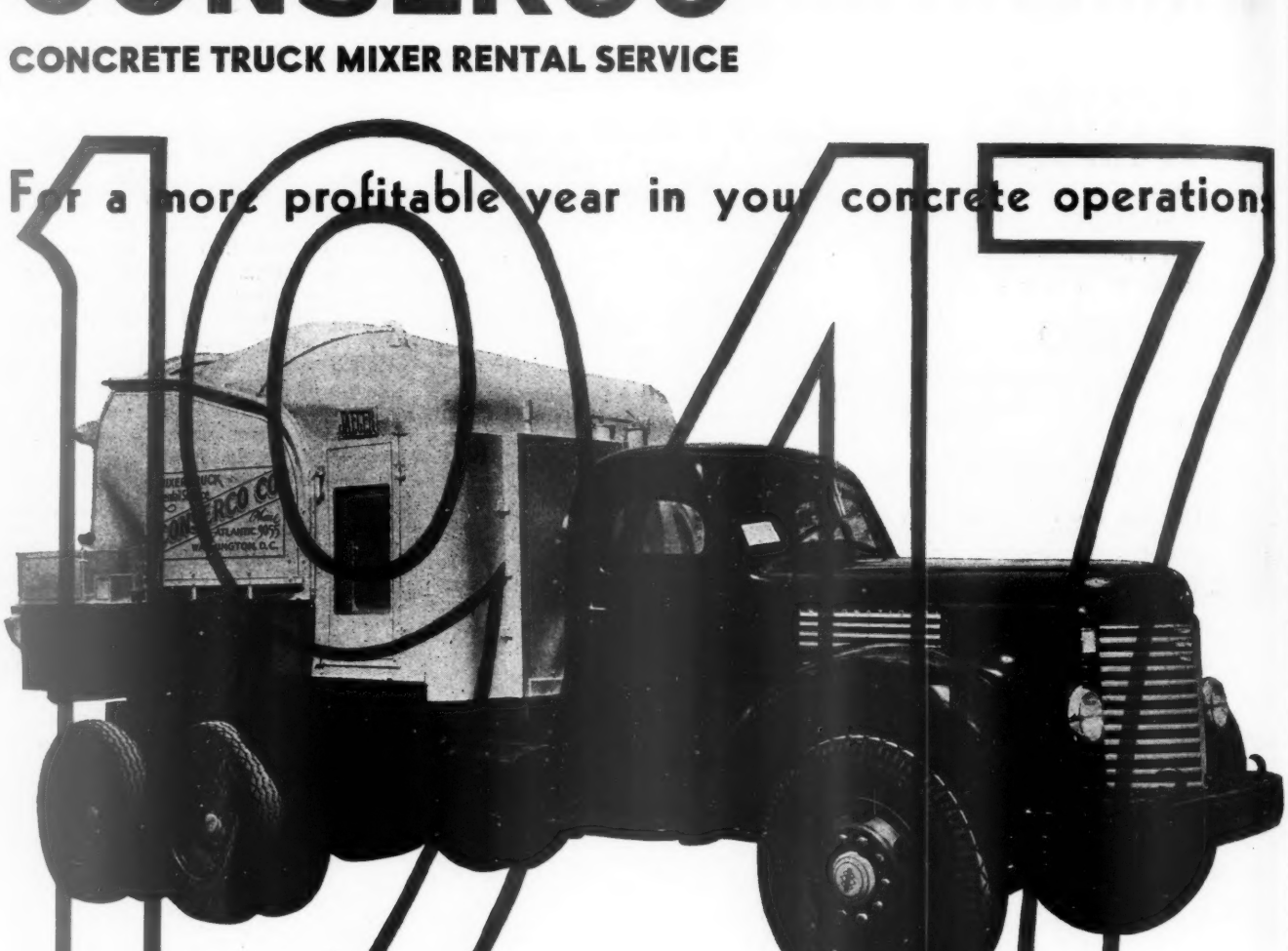
March 5-7, 1947 — Los Angeles. 17th annual convention, National Ready Mixed Concrete Association, Biltmore Hotel.

(For announcements concerning meetings of groups representing nonmetallic mineral industries, see page 81.)

CONSERCO

CONCRETE TRUCK MIXER RENTAL SERVICE

For a more profitable year in your concrete operations



In the months to come, you will have the opportunity to figure on many construction projects that will be too large for you to handle with your own trucks.

Such projects are made accessible to those who employ the CONSERCO System . . . a service which has been successfully rendered for over nine years.

CONSERCO offers monthly leases on heavy-duty 3, 4 and 4½ cubic yard tandem drive trucks, in perfect working condition. The lessee has complete control of the equipment throughout the contract period.

Profitable long-range concrete operations are assured by the CONSERCO method, as all rentals are deductible from income taxes, and there is no expenditure of capital.

Write for Information

CONSERCO CO. 1620 Second Street, S.W., Washington 4, D. C.

American Concrete Pipe Assn. to Meet in St. Louis For 39th Annual Session

Officers of the American Concrete Pipe Association have issued an announcement concerning the 39th annual convention of that organization, which is to be held at the Hotel Statler in St. Louis from February 24 to 26, not on February 23 to 25, as previously announced.

Howard F. Peckworth, the association's managing director, urges those planning to attend the sessions to make reservations promptly. He recalls that the first meeting of the group was held at Emmetsburg, Ia., in April of 1907, when "most of the men present wore handle-bar moustaches and Teddy Roosevelt was in the White House." The rallying cry, says Mr. Peckworth, is "Meet me in St. Louis."

Gage for Entrained Air Shown at N.S.G.A. Course

During the recent National Sand and Gravel Association short course held at the University of Maryland from November 18 to 23, 1946, a gage for determining the amount of entrained air in concrete was demonstrated. The device is made commercially by George J. Heck, 562 Minnesota Street, St. Paul, Minn., and was developed from an experimental model which originated in the association laboratory at the U. of M. The original model, invented by Stanton Walker, engineering director, National Ready Mixed Concrete Association and National Sand and Gravel Association, and W. H. Klein, former vice-president of the Pennsylvania-Dixie Cement Corp., was also demonstrated.

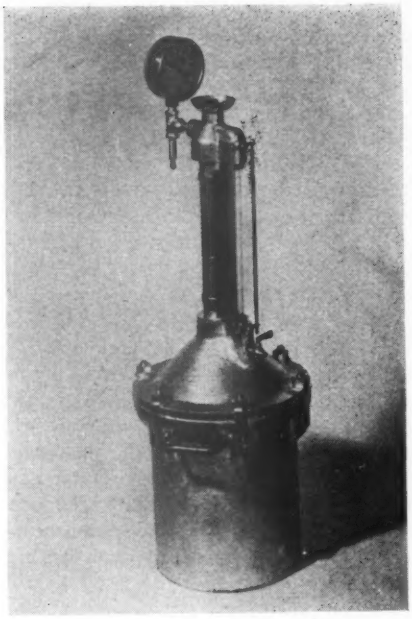
The gage of the original model was calibrated in cubic centimeters, and the bucket held 1/5 cubic foot. The commercial, or Heck model reads directly in percent of entrained air, and holds 0.225 cubic foot of concrete. The apparatus, as supplied by the manufacturer, consists of the gage assembly, as illustrated, one wrench, one pump, one tamping bar and one extra gage glass.

To make the test, the bucket is filled with air-entrained concrete, which is rodded carefully as it is poured. The side of the bucket is then tapped to eliminate large air bubbles, and a metal disc is laid on top of the concrete to prevent the roiling of the surface of the concrete by the water used in the test. The top half of the device is then bolted on, making the gage assembly airtight. A gasket is fastened permanently to the top half of the gage.

The gage is then filled with water and the water level is adjusted to the zero mark on the gage glass scale, which reads from zero to 6 percent. The pump is attached, and 30 pounds p.s.i. of air is forced into the unit by means of the pump. The percentage of entrained air can now be read directly from the gage glass scale.

When the air is then released the water should return to zero level. Any difference between the water level and zero should be subtracted from the percentage reading.

The test takes 8 to 10 minutes to perform. The gage is calibrated for an altitude of 800 feet above sea level, but the maximum calculated error, due to change in atmospheric pressure, when the gage is used between sea level and 1800 feet above sea level is —0.056 percent at full scale (6 percent).



• The Heck gage.

The gage is available in iron, weight 54 pounds, or aluminum, weight 24 pounds.

Portland Pumice Block Plant To Make 10,000 Units Daily

C. E. Felmley, owner of the Western Block Company of Portland, Ore., recently announced that he will begin production of standard special-size pumice building units at the rate of 10,000 per day as soon as the city testing laboratory passes his product. Mr. Felmley will employ machines which he designed and built for turning out the block, using a process he himself developed.

The new plant has been built in such a way that the present facilities can be expanded. Mr. Felmley expects soon to add as many as seven more kilns to the three already installed.

Lightweight Tile Featured In Houston Firm's 3 Plants

Black-Brollier, Inc., a Houston, Tex., firm which manufactures concrete building tile, is now operating three plants in that city. A product featured by the firm is its "Featherlite" tile, which weighs about one-half as much as the standard variety, but which is said to have the same load-bearing and durability qualities as the ordinary tile.

Proprietors are Lee Brollier, George Black and Ernest Black, who established the business in 1936.

N. C. Concrete Masonry Association Seeks To Improve Products

The North Carolina Concrete Masonry Association said today that its membership has jumped to 33 plants within the past month and that the association's program, designed to guarantee better concrete blocks by setting up high standards to be met by manufacturers, is gaining unprecedented support.

G. W. Hutchinson, executive secretary of the association, said that the movement is the first of its kind in the whole country in which the industry is promoting better concrete products by demanding that the industry itself take the action. Large and small manufacturers are taking active part in the program. The association is open to any manufacturer who can meet the quality standards.

The association was formed in Raleigh in early October, when a dozen North Carolina concrete block makers decided that post-war standards of concrete blocks were necessary in order to protect the public from inferior products.

David S. Weaver, head of the department of agricultural engineering at North Carolina State College, has endorsed the plans of the association to improve and guarantee high-quality concrete blocks for building in North Carolina.

Pomona, Calif., to Have New Products Plant

A new concrete-products plant will open this spring in Pomona, Calif., following the installation of equipment during the winter months. The plant, to be owned and operated by the Stafford-Vaughn Co., will manufacture typical California-size masonry units on a Flam No. 3 vibrator.

The 8-cu.-ft. mixer and the 8-cu.-ft. hydraulic skip-hoist feeding the mixer will be suppied as a unit by the Williams Mechanical Development Co. of Glendale, Calif.

American Superior Products To Build $465,000 Plant

At Seaford, Del., the American Superior Products Corporation, a newly-organized Eastern firm, soon will begin the construction of a $465,000 plant for the production of sand lime bricks. Capacity of the plant is expected to be 5,000,000 bricks per month. A sludge rich in lime, which formerly was an unused byproduct of a Southern rayon plant, will be the basic raw material. Production is scheduled to begin in about five months.

William J. Rau of Salisbury, Md., is president and Jacob L. Warner of Wilmington, Del., is vice-president of the firm. It is expected that about 150 persons will be employed at the Seaford plant.

Outlook for Ready-Mix Industry Bright As '46 Volume Hits 18,000,000 Cu. Yd.

WITH the close of the first post-war year, the ready-mixed - concrete industry found itself, unlike many branches of the huge construction industry, in an inviable state of complete preparedness for the long-awaited building boom. Whether that boom would ever emerge from the welter of confusion and red tape resulting from the Administration's fumbling efforts in the role of midwife was another question altogether. The underlying factors necessary for a healthy and sustained construction boom were still present, and might, now that most of the strangling controls had been removed, have an opportunity to function normally. When and if the boom materialized, the ready-mixed-concrete industry would be in excellent shape to cope with any demands which might be made upon it. With no reconversion problems, the industry had made good use of the marking-time period to repair its plants and to rebuild its organizations, with the result that by the close of 1946 it found itself in far better condition with respect to productive facilities and personnel than was the case at the outset of the war.

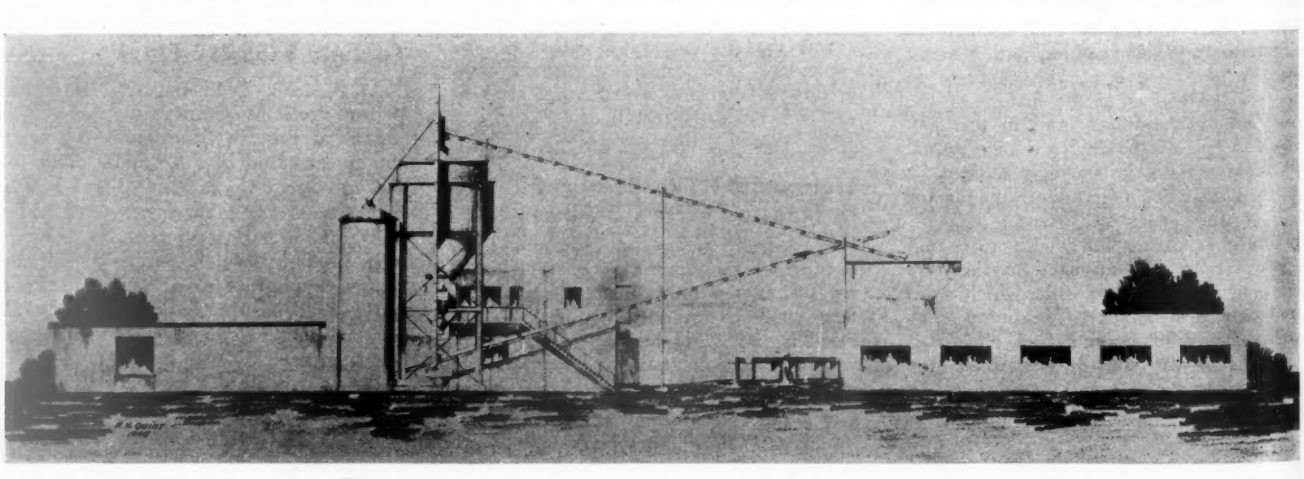
Some progress was made during the year in respect to the replacement of trucks and mixers, which were badly depleted during the war period, but deliveries were still slow, and it was a fair bet that producers would still be clamoring for new equipment throughout 1947. The supply situation in regard to bins, batchers, conveyors, elevators and similar equipment was somewhat easier, but it was still necessary to anticipate such needs well in advance of actual requirements.

Production in 1946 was probably around 25 percent greater than during the preceding year, or approximately 18,000,000 cubic yards. Compared with 1942's tremendous output of 24,000,000 cubic yards, this seemed a rather unimpressive showing, but it was well to remember that when annual production reached a level of 10,000,000 cubic yards in 1942, the figure represented a new all-time high for the industry. The productive capacity of the nation's plants (a somewhat nebulous yardstick in the ready-mixed-concrete industry) showed a measurable increase during 1946, due to a fair level of new plant construction, improvements to existing plants and improvement in the labor-supply situation. By and large, at the outset of 1947, the industry was in excellent shape to repeat its war-time performance whenever construction activity demanded it. In a few localities, the cement shortage had caused temporary shortages of ready-mixed concrete during the year, but there was every reason to expect improvement in this situation early in 1947.

On the labor front, good news to producers was a ruling by the United States Circuit Court of Appeals for the Tenth Circuit favoring the employer in the E. C. Schroeder Company case. This concerned the A-14 ruling of the Wage and Hour Administrator which brought within the coverage of the Fair Labor Standards Act all work done in producing materials for such interstate facilities as highways and railways. The ruling had opened the way for back wages suits against hundreds of producers who do not ship their products across state lines and who had not, for that reason, considered themselves covered by the Fair Labor Standards Act.

The industry's safety contest, sponsored by the National Ready Mixed Concrete Association, got underway during 1946, and the first awards were scheduled for presentation at the association's 17th annual convention to be held in Los Angeles early in March. The contest was to be scored in four parts: (1) accident frequency rating of personnel at the plant, 15 points; (2) accident frequency rating of personnel engaged in delivery, 35 points; (3) public liability rating, 20 points; (4) property damage rating, 30 points. Suitable trophies, furnished by PIT AND QUARRY, were to be presented to winners in two independently-judged contests, based on the volume of concrete produced.

Research and other activities of the industry's alert association were carried on at an accelerated pace during 1946. Research projects either in progress or contemplated for the near future included basic studies of concrete proportioning and design, the development of field control methods, and studies of admixtures, durability measuring methods and volume changes in concrete during hardening. Larger and better laboratory facilities for such important projects became a virtual certainty when the University of Maryland, where the association's research laboratory is situated, announced a $5,500,000 construction



One of the important new plant developments during 1946 was this layout of the Albuquerque Gravel Products Company at Albuquerque, New Mexico.

program for new engineering buildings. At the close of 1946, membership in the association stood at the highest level in the organization's 15-year history, with more than 240 member companies participating.

As it faced a new year, and possibly a new era, in its operations, the industry was aware that it had a few unsolved technical problems with which it must deal. Most of these (happily) required little more than the application of known methods and equipment to existing plants. Customers had a tendency to demand more accurate control of batching in the production of ready-mixed concrete, and smart producers who had not already done so were making every effort to modernize their plants in this regard. Producers were finding it increasingly necessary to supply a multiplicity of mixes, and to have available a number of different types of cement. With the removal of price ceilings and the increasing availability of materials and equipment, the trend toward such refinements seemed likely to become general, but producers could scarcely ignore the fact that ultimately the resulting additional costs would have to be passed on to the consumer. Standardization of mixes seemed the best solution to this and related dilemmas, and farsighted producers were becoming reconciled to the notion that any action in this direction would have to originate with the ready-mixed-concrete industry itself.

The success of a short course held at Purdue University early in the year, for producers of ready-mixed concrete, gave clear indication of the industry's growing concern with problems of a technical nature. Approximately 100 individuals attended the lectures. Among the speakers were Stanton Walker, director of engineering, National Ready Mixed Concrete Association, and M. A. Swayze, director of research, Lone Star Cement Corp.

An important development during 1946 was the drafting of a proposed standard hauling contract for ready-mixed-concrete manufacturers. Prepared by the National Ready Mixed Concrete Association, the proposed contract is designed to clarify the relationship between renter and truck owner in respect to such important problems as compliance with the Fair Labor Standards Act, the social security law and transportation tax requirements. The text of the proposed agreement, which will come up for discussion and possible action at the association's annual meeting in Los Angeles, is reprinted below for the benefit of those who may have missed its original publication in the June, 1946, issue.

• The Kansas Sand Company of Topeka, Kansas, is marketing mixes of dry ready-mixed concrete for use in repair work. Four different types of mixes adapted to various uses are being produced. A carload of the material is here shown ready for shipment.

Proposed Standard Hauling Contract

Whereas, Standard Corporation (hereinafter referred to as Standard) desires to procure the transportation of certain property and materials, consisting of rock, sand, gravel, (list other products) and/or by-products thereof, and the undersigned trucking contractor (hereinafter referred to as the contractor) is willing, as an independent contractor, to furnish such transportation,

Now, therefore, in consideration of the premises and undertakings hereinafter set out, it is agreed as follows:

1. The contractor represents and warrants that he is engaged in the trucking business and owns..... trucks used in connection with such business.

2. The contractor further represents and warrants that he is the holder of all of the necessary State and/or Federal certificates or licenses which are required or necessary for him to conduct his business as a hauling contractor.

3. The contractor further represents that he is fully protected by workmen's compensation, public liability and property damage insurance, and will continue to be so protected during the term of this agreement, and does undertake and agree to hold and protect Standard free and harmless from and against any and all liability, loss, cost, damage or expense by reason of anything done or suffered by contractor hereunder.

4. It is mutually understood and agreed that Standard shall notify the contractor of the material or property to be transported, and of the time and location of the place to load the same, and of the place of delivery, all within a reasonable time prior to the date that delivery is required; that thereafter the contractor shall, with all reasonable diligence, cause such materials and property to be transported to the place indicated.

5. It is agreed that contractor shall not be required to transport any more materials than can be transported by contractor's equipment, but transportation for Standard hereunder shall take priority over any transportation by contractor for any other person, firm or corporation, and it is agreed by Standard that the truck or trucks of contractor will be given a place in the line with Standard's trucks of a similar size and the trucks of other trucking contractors of a similar size, to the end that contractor shall transport a share of materials to be transported for Standard by such type of truck proportionate to the number of such trucks so available for use.

6. It is mutually understood and agreed that Standard shall have no control over the truck drivers or any other persons used or employed by the contractor, nor shall Standard have any control over the route, method of hauling or transportation, or the detail or management thereof. It is further understood that the contractor shall cause such materials and property to be expeditiously and safely transported, and in doing so, shall, at his own cost and expense, furnish all necessary labor, equipment, gasoline and oil, repairs,

other supplies, and all other things necessary to that end, and shall have full charge, control and responsibility over the manner and method employed, and shall pay all taxes levied in connection with such operations.

7. Contractor shall not be required hereunder to transport material other than rock, sand, gravel, (list other products) and/or by-products thereof.

8. Standard agrees to pay the contractor for the performance of hauling service in accordance with the following schedule:

[Insert schedule.]

9. It is understood and agreed that Standard shall pay the contractor in accordance with the above-listed schedule on the ..... day of each month for all hauling done in the previous calendar month.

10. It is understood and agreed that this contract shall terminate upon ..... day's due notice by either party thereof to the other, or may be terminated by either party on one day's notice in event of breach hereof by the other.

11. It is understood and agreed by and between the parties hereto for himself or itself and any and all employees of either as a condition absolute and precedent to the making of this contract:

(a) That the said contractor herein shall stand solely in the capacity of an independent contractor;

(b) That the said Standard shall exercise no direction or control over any of the employees of the contractor or the manner in which any of the work or services hereunder to be furnished shall be performed; and

(c) That under no circumstances shall any of the employees of the said contractor be construed to be or have or exercise any rights or claims as employees of the said Standard.

12. The contractor further represents and warrants that during the terms of this contract he will comply with all laws, regulations and orders now effective or which shall hereafter become effective which govern his activities under this contract as an independent contractor.

In witness whereof, the parties hereto have caused this agreement to be executed this..... day of ..... 194.....

STANDARD CORPORATION

By.....

.....

Contractor

Witnesses:

.....

.....

At least one producer was able to announce during the year a practical solution to the perennial problem of truck mixer delays at the job. During the war Ready-Mix Concrete, Inc., of New Albany, and Jeffersonville, Indiana, operated more than 50 truck mixers on various important war projects. All the usual methods of reducing delays were tried, such as imposing fines, reducing the number of trucks used on the jobs which showed excessive delays, and the provision of hoppers and wheel barrows for storage of concrete on the job. None of these expedients had the slightest effect. Finally, at the suggestion of the company's drivers, 5- by 8-in. cards (see cut), which state that drivers are allowed 20 minutes in which to unload, and require the owner or contractor to explain delays, were delivered with the first load of concrete to each job. No charges are made for delays, but the moral effect of the system has been sufficient to effect a 90 percent reduction in time lost at the job.

NEW ALBANY **READY-MIX CONCRETE, Inc.** JEFFERSONVILLE

IMPORTANT!

The operator of this truck is allowed a maximum of **20 MINUTES** in which to **UNLOAD** this concrete. If more than **20 MINUTES** is required, please **SIGN THIS CARD.**

Ticket No._____ Date_____

Time required to unload this truck. Hours_____ Minutes_____

Cause of delay _____

_____

_____

Signature of Contractor or Owner _____

The **COST** of concrete is governed by the length of the haul and the **UNLOADING TIME.** Please cooperate with us so that we will not be compelled to advance our prices, as has already been done on other building materials. WE ARE TRYING HARD TO HELP YOU, BUT NEED YOUR HELP TO DO SO.

• Ready Mix Concrete, Inc., of New Albany and Jeffersonville, Indiana, solved the perennial headache of truck mixer delays at the job by requiring contractors or owners to fill out a simple form explaining the reason for any unloading time in excess of 20 minutes. The practice brought about a 90 percent reduction in time lost at the job.

Haulage in non-agitating equipment continued to arouse some interest among producers during 1946, but the mild furor had quieted down considerably. Among producers using this method of delivery there seemed to be general agreement that its largest field of application was in the 7- to 8-mile haulage range. Wide extension of the practice remained dependent upon general revision of the various state specifications. The first step in this direction would of necessity involve revision of the present A.S.T.M. specification which limits ready-mixed concrete to material delivered in agitator trucks, thus, in effect, ruling out central mixing with dump-truck delivery.

Summing up the year just past, the ready-mixed-concrete industry could find some satisfaction in the knowledge that its house was in good order. Release from the restrictions of price control gave assurance that future sales would be at price levels which would justify plant improvements with a view to providing customers with more and better service. There were indications, too, that equipment manufacturers could and would make shipments in 1947, if there was no renewal of the strikes which crippled production repeatedly during the past year.

Too many imponderable factors remain in the overall construction picture to encourage forecasts of the volume of business which the ready-mixed-concrete industry might anticipate during the coming year. Restrictions on commercial construction were still in effect, and residential building still suffered from countless material shortages as the nation welcomed the new year. If these problems could be untangled soon enough, the 1947 output of ready-mixed concrete could easily approach 1942's whopping 24,000,000 cubic yards.

Are you contemplating the production of sand and gravel or crushed stone? Several chapters in the Pit and Quarry Handbook give you the latest and most complete information on production methods and equipment.

Production of Concrete Masonry Units Soared Above Billion Mark in 1946

New Record Doubles Output Of Previous Peak Attained In 1941; Signs Indicate Shift to Buyer's Market

ALTHOUGH the anticipated construction boom failed to get into high gear during 1946, the concrete masonry industry contrived to enjoy a private boom all its own, and in the process at least doubled the output of its previous peak year of production. The industry's mushrooming growth during the year made accurate estimates of production virtually impossible, but every available yardstick of measurement pointed strongly to a figure of at least 1,000,000,000 8-in. equivalents.

Even a generation rendered blasé by 15 years of astronomical federal deficits still had difficulty in wrapping its imagination around quantities in the billion range. Serious practitioners of the art of putting things end to end to determine how many times they would encircle the equator (or accomplish some other equally useful task), could have a field day with 1,000,000,000 concrete masonry units. They could figure, out, for example, that the industry's 1946 output, laid side by side, and end to end, would pave a strip 22 feet wide and 7,650 miles long. Or channeled directly into much-needed housing, it would make 400,000 dwellings at an average of 2,500 blocks per unit.

While there was no evidence that the year's output had gone into anything so frivolous as a 7,650-mile paved runway, it was equally certain that it hadn't yielded 400,000 dwelling units. The reasons for this were many and diverse. Under the building restrictions that existed until late in the year, it was easier to build bowling alleys, hot dog stands and night clubs. Although the restrictions on building were blamed without reservation, other factors bore some measure of the responsibility. Continued shortages of hardware, plumbing and electrical fixtures, door and window frames and a host of other items kept home construction high on the list of hazardous undertakings. On the labor side, skilled mechanics, particularly plasterers and masons, seemed to have joined Lo, the Poor Indian, on the list of vanishing Americans. Until these bottlenecks had been cleared, the high production of concrete masonry units could have little effect upon the housing picture.

There was ample evidence in the closing months of 1946 that the seller's market in masonry units was about over. If the housing log jam could be broken soon enough, there was a fair possibility that demand might again approximate productive capacity, but the outlook for 1947 definitely indicated a return to a buyer's market. Stockpiles were reappearing on plant yards in many sections of the country, and from almost all sections reports suggested that the joy ride was about over. There was evidence on every hand that a sizeable portion of the 1946 output hadn't actually gone into building construction at all. A common phenomenon was the dreary

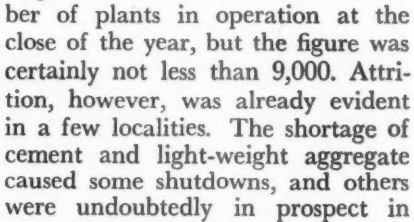
• Some companies were preparing for the buyer's market. Exhibits of this kind, put on by the Geist Coal & Supply Co. at the Greater Cleveland Home and Flower Show, help to sell masonry units.

• Cinder block makers find they can maintain much better control of quality with their own setup for processing aggregates.

spectacle of concrete masonry units piled up on thousands of vacant lots throughout the nation in anticipation of building. Quite as useless, and even more damning in their mute testimony to the failure of the housing program, were the thousands of basement foundations and empty shells of houses left fully exposed to the elements when labor or material shortages overtook them.

The return to a buyer's market posed a new set of problems for the industry, and particularly for the considerable fraction of it which had never known a time when it was necessary to sell output. Older concerns that were well established long before the war had perforce developed some merchandising habits and techniques, and their problem was mostly that of recultivating the selling point of view. Newcomers (and there were a lot of them) would have to start from scratch. For them the path ahead could be pretty rocky, and the heavy casualties would inevitably occur among those who fumbled too long with the problem. The industry's over-all performance in the field of merchandising had never been impressive, although there were a few bright spots in the picture. Perhaps a score of companies throughout the nation were set up to do a top notch job of merchandising their output, and it was a safe bet that under the pressure of growing competition, not only from within the industry but from competitive materials, countless others would follow their lead.

New plants were built, and existing plants were enlarged, during 1946 at an almost incredible rate. Block plants became almost as ubiquitous as corner drug stores or filling stations. One guess was about as good as another on the total number of plants in operation at the close of the year, but the figure was certainly not less than 9,000. Attrition, however, was already evident in a few localities. The shortage of cement and light-weight aggregate caused some shutdowns, and others were undoubtedly in prospect in areas where productive capacity was obviously far in excess of demand. The C. P. A. estimated that the industry's present productive capacity was about 70 percent greater than demand. This figure was rather hard to swallow, since neither capacity nor demand was a matter of record, but at least it sounded a timely note of caution to those who might still have the block business confused with the Klondike gold rush.



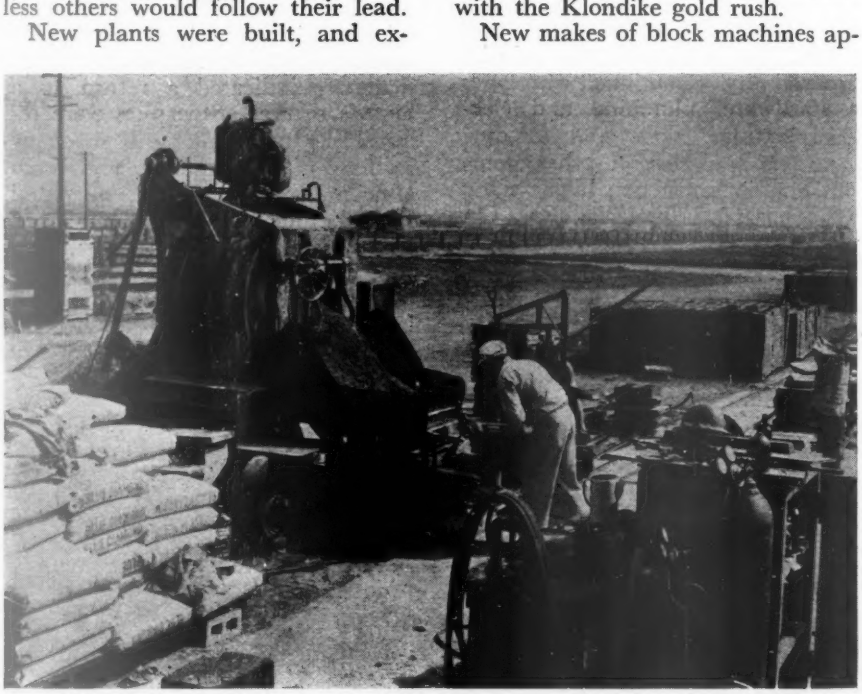
• Outlet ducts for hot air in curing room at Barnes & Cone plant, Syracuse, New York, mark new trend toward high-temperature curing.

New makes of block machines appeared in droves during 1946 (see machinery review). They ranged from low-cost, low-production units to relatively-costly, high-production machines. With a very few exceptions, however, there were no startling innovations in design, and it was still true that low cost machines meant rather high unit labor cost for the user.

The subject of curing remained highly controversial as the industry faced the new year, but there was a good prospect that some of the answers might be forthcoming in the not-too-distant future. Several research-minded producers were experimenting with various types of heat, accurate controls of both temperature and humidity, and methods of exhausting kilns between moist curing and drying cycles. Relatively-high temperature (in the neighborhood of 200 degrees F.) seemed to provide a good answer to the problem of reducing the time between manufacture and delivery, but many producers questioned if the end would prove worth the additional cost, if the same quality could be achieved with 30 days yard storage.

Year	No. of Plants	Average No. of Workers	Gross Selling Value of Products
1934	88	489	$1,042,258
1935	94	519	1,154,138
1936	97	602	1,713,347
1937	109	840	3,299,331
1938	119	834	3,200,419
1939	122	951	3,716,692
1940	128	1,145	5,303,560
1941	122	1,222	6,070,677
1942	141	1,368	7,315,041
1943	140	1,222	5,639,260
1944	149	1,195	6,558,463

Figures in this partial survey of the block industry from 1934 to 1944 make an interesting comparison with the $140,000,000 business done in 1946.



• Suggestive of a new trend in the block industry is this portable plant developed by the Acme Block Co. of Hynes, California. Plant is completely self-contained, powered entirely by gasoline engines.

One of the best indications that the block business had definitely attained the stature of an industry was to be found in the steady growth of the National Concrete Masonry Association. Some 125 new companies joined this alert organization during the year to bring the total membership up to about 450. Under the capable direction of E. W. Dienhart, executive secretary, the association's service to members was expanded considerably during 1946, necessitating the establishment of larger offices in downtown Chicago. R. E. Copeland, who had for 17 years served on the staff of the Chicago headquarters office of the Port-

(*Continued on page* 203)

FIRST SINTER - LITE PLANT IS MAKING LIGHTWEIGHT AGGREGATE FROM FLY ASH

AMONG the many men who have contributed to the success of the concrete masonry industry we find well up at the head of the list the name of Louis Gelbman, of Concrete Units, Inc., Bronx, N. Y.

Mr. Gelbman has been in the concrete masonry industry for over 35 years and his invention of the vibration-under-pressure process of molding concrete block was one of the major steps forward in the industry. His latest invention, a process for economically manufacturing a light-weight concrete aggregate to take the place of the fast-disappearing cinder supply provides the answer to the question every concrete masonry manufacturer is asking: "Where can I get a quality aggregate to keep my plant running?"

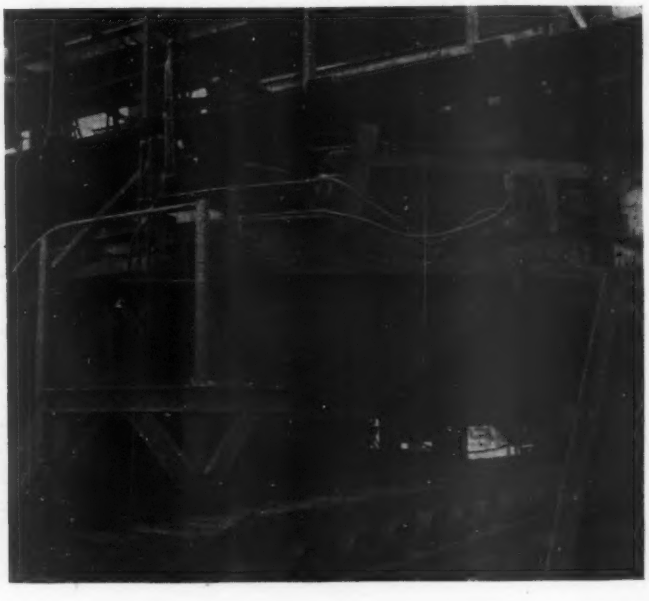
During the war the large power plants all over the country which had been the chief source of quality cinders for the concrete masonry industry, were going to a new method of burning pulverized coal. This method resulted in residues known as fly ash and water slag. Unlike cinders, this fly ash and water slag could not be used as a fill or as an aggregate for concrete work, and the disposal of it became a major headache for the power companies. This matter was brought to the attention of Mr. Gelbman and he set out to do two things. First, to solve the disposal problem for the power companies, and second, to find a good light-weight aggregate to take the place of the cinders that were not being produced any more.

Fly ash in itself is too fine to be used as a concrete aggregate. The physical characteristics of the material have to be changed before it can be used. Mr. Gelbman built and patented a rotary sintering machine to change this fine, dust-like fly ash and the somewhat coarser water slag into a clinker which could be crushed and graded for use as a light-weight concrete aggregate. From the process of sintering he derives the name of his aggregate "Sinter-Lite."

The first step in the making of "Sinter-Lite" is to put the fly ash and water slag into a large bin which feeds into a continuous mixer where the fly ash is mixed with water. From this mixer the fly ash flows into the sintering machine, which consists of a large wheel 16 feet in diameter, the bottom of which consists of hinged grates. Under the grates and completely enclosed except for the air which can come through the grates there is a wind box which is connected to a sintering fan. The purpose of the sintering fan is to pull air down through the mass of material on the grate and thus support combustion. Fly ash contains its own fuel, from 6 to 20 percent as it comes from the power companies, and it is not necessary to add anything to make it burn. The sintering wheel is turning constantly at a slow speed and is divided by partitions into separate sections.

When a section is filled and leaves the mixer, it goes under an ignition car. Here the mass of material is lighted from the top and since the fan is pulling air down, it burns from the top down to the grate, the reverse of an ordinary fire. The ignition car stays over the section for one minute, at the end of which time the entire top of the section of material is ignited. The section then leaves the ignition car, which goes back to light the one following. The lighted section then travels over the wind box for approximately 18 minutes. The fly ash is now in the form of a clinker, having been brought to the point of incipient fusion by a heat of 2400 deg. F. This particular section of the sintering machine is now ready for dumping and goes over an open section of the machine where the grate retracts and the clinker falls out. The section then goes back under the mixer and the process is repeated.

After the clinker leaves the sintering machine, it falls onto an apron conveyor which brings it to a clinker breaker. This machine breaks the large sintered clinker down to approximately 2-in. pieces. From the clinker breaker the material goes over a vibrating screen equipped with bars spaced ¾-in. apart. All material passing over this screen goes into a small bin and is now the finished product, except for secondary crushing, screening and grading.



• Below, left: Louis Gelbman with his sons, Martin (left) and Lawrence (right). Lawrence just completed four years' service in the Coast Guard.

• Below, right: Closeup of the sintering machine with apron conveyor which feeds clinker to crusher.

The material passing through the ¾-in. screen goes onto a conveyor belt and back to the mixer and is thoroughly mixed with the raw fly ash, which mixture then goes back into the sintering machine for burning. The purpose of this operation is to make certain that any material which is to be used as a concrete aggregate is pure clinker and does not contain any unburned fine material.

The weights of Sinter-Lite manufactured from the fly ash and water slag combined are as follows:

½-in. maximum crusher run	51 lb. per cu. ft.
½-in. to ⅜-in. screened	34 lb. per cu. ft.
⅜-in. maximum size crusher run	55 lb. per cu. ft.
⅜-in. to ⅛-in. screened	45 lb. per cu. ft.
⅛-in. sand size	56¾ lb. per cu. ft.

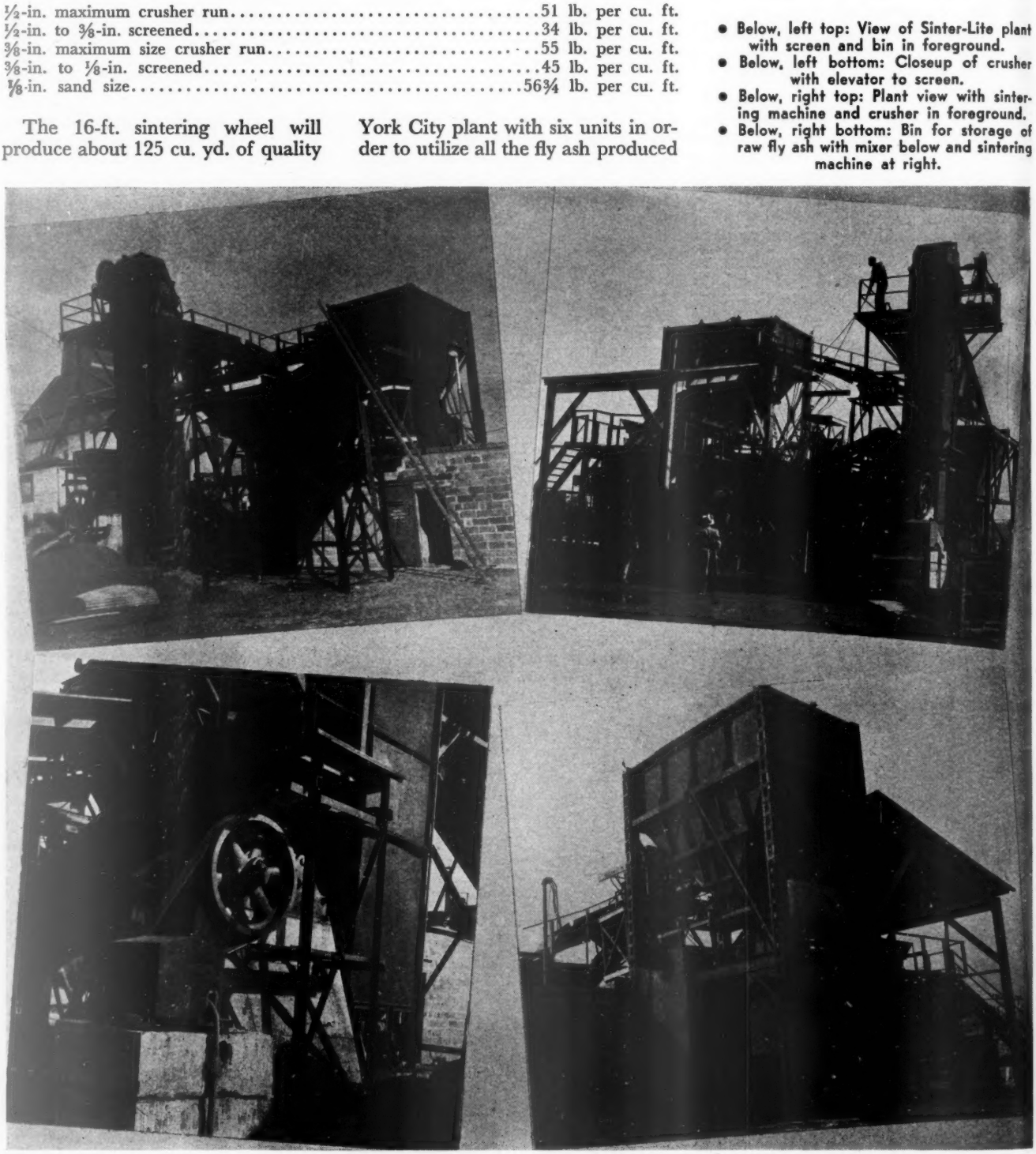
The 16-ft. sintering wheel will produce about 125 cu. yd. of quality concrete aggregate every 8 hours. If more aggregate is needed per day, the machine may be run two or three shifts, or more machines can be added to increase production.

Although Mr. Gelbman's sintering plant in New York City was built primarily for sintering fly ash, which is available in that area, he has made many tests and has succeeded in producing with it a high-grade, light-weight aggregate from clay, shale or any other similar material.

It is planned to equip the New York City plant with six units in order to utilize all the fly ash produced in that area, which is now being dumped at sea by the power company. It will then be possible to furnish the finished aggregate to the trade at a low price.

Because the "Sinter-Lite" process can turn many kinds of materials into a light-weight concrete aggregate and because it will assure the architects and engineers of getting a uniform high grade aggregate in their masonry products and in their poured concrete, it will make possible the use of light-weight concrete in many sections of the country where it is not available today.

- **Below, left top: View of Sinter-Lite plant with screen and bin in foreground.**
- **Below, left bottom: Closeup of crusher with elevator to screen.**
- **Below, right top: Plant view with sintering machine and crusher in foreground.**
- **Below, right bottom: Bin for storage of raw fly ash with mixer below and sintering machine at right.**



Concrete Pipe Industry on Upgrade Boosts '46 Output 67 Percent Over '45

UNLIKE practically all other industries in the nation, the concrete pipe industry in the year just closed was digging its way out of a depression. From a peak output in 1942 of about 4,000,000 tons, production had dropped by stages to a low of around 1,200,000 tons in 1945. Since the conditions which demanded the output of 4,000,000 tons in 1942 were abnormal, it was perhaps unfair to use that year as a yardstick, but it certainly provided a definite measure of what the industry was capable of producing.

Although production in 1946 was unquestionably on the upgrade, it was still a poor year, and many companies, both large and small, operated in the red. A fair guess on 1946 output was somewhere in the neighborhood of 2,000,000 tons. This indicated 70-percent increase over 1945 was certainly a welcome reversal of the downward trend in recent years, but at the very best it meant simply that the industry had operated at somewhere around 50 percent of capacity—or a little (but not much) over the break-even point.

Harassed throughout the war years (and after) by ruinously low price ceilings, pipe manufacturers had by and large given up making the smaller sizes of pipe (12 inches and under), and even on larger units the margin of profit had been squeezed dangerously low. Yet, when ceilings were removed late in the year, the average weighted increase necessary to put manufacturers on the profit side of the ledgers proved to be only 10 percent.

• Extensive improvements have been made in material handling and batching facilities at the Jacksonville, Florida, plant of the Sherman Concrete Pipe Company.

The industry made good use of the period of slack operations during 1946 to carry out much-needed plant improvements in anticipation of the almost-certain upswing in demand. Its labor situation was much improved, and it was again possible to order equipment with some expectation of obtaining delivery before the purpose in placing the order had been forgotten or voided by changed circumstances.

While there was nothing giddy about the industry's outlook in the immediate future, it seemed virtually certain that the upswing noted in the past year would continue for some time. Huge sums of money already allocated for highway construction and other public works projects were bound to cause an increase in demand, and if the brief recession widely predicted for 1947 should actually occur, the effect could only be to accelerate work in the public domain.

Although in spots the pipe industry suffered somewhat from the shortages of cement and steel, in general these problems were not serious enough to affect materially the total output for the year. In this respect the industry benefited from the fact that it consumes only a very small percentage of the nation's annual output of cement and steel. With anticipated improvements in the general supply of both materials, any dislocations affecting the pipe industry during the coming year were likely to be quite local and of short duration.

On the technical front, the year just past failed to reveal any startling innovations. There was word-of-mouth news of the successful application of harmonics to the vibration of large-diameter poured pipes. Developed in connection with work on the San Diego aqueduct, the method utilizes two variable-speed vibrators, one placed on the inside form and the other opposing it on the outside form. Another development in the poured pipe field involved the application of a vacuum process for removing excess water from the concrete. The method was developed by the Concrete Products Company of America, and is said to produce concrete of high initial strength and with excellent surface

(*Continued on page* 203)

• Among the industry's newer productive units is the Erie, Pennsylvania, plant of the Concrete Pipe Company of Ohio.

How to Build with Concrete Blocks-- As It Was Done by Brazilian Builders

To build that new world, we'll need fewer architects and more block-layers.
—*The Slipstream.*

TO fill the world's need for more and better homes at less cost, prefabrication of building units is indeed the solution. The size of such prefab units is what building authorities are uncertain about.

Considering cost of building units, there is no question but that hollow concrete block or 8- by 8- by 16-in., for sand and gravel (cement) block and 8- by 8- by 18-in., for lightweight cinder or pumice block, are the cheapest and easiest to make.

By **GEORGE W. HOFFMANN**
Consultant on
Concrete Industries

Lack of recognition of concrete block in the prefab construction field is due to the fact that, although block making has been greatly improved in recent years, block laying is as inefficient and primitive as ever.

Here is a story of how Brazilian builders solved this problem many years ago.

At the end of 1930 Brazil decided to stop being a purely agricultural country and establish industries. All natural and financial resources were available, except industrial labor.

Studies of how to make healthy, creative, productive industrial labor out of sickly, undernourished and unproductive agricultural natives pointed toward furnishing healthful housing and an intelligent diet.

• An airplane view of a Brazilian seaside housing project at Santa Catarina (Florianopolis), which was built of concrete blocks by the methods described and illustrated in this article.

For rapid, low-cost, healthful construction, Brazil's Social Security Institutes, entrusted with the problem of creating the non-existent Brazilian industrial workman, decided that hollow concrete block was, then as today, the only solution.

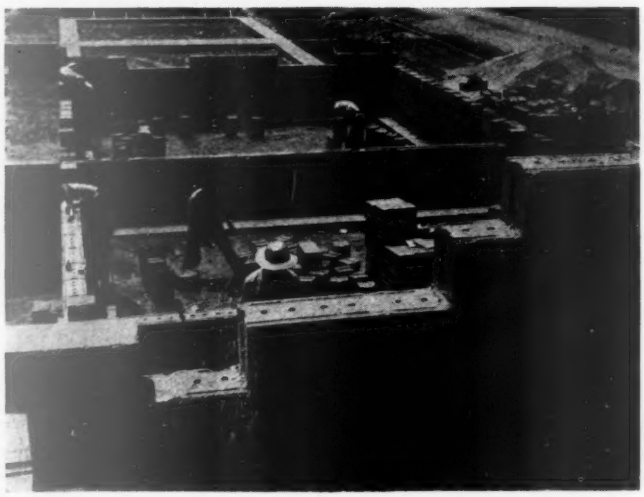
American and European block machinery and "know-how" were purchased and put to work, with the result that, only a few years after initiating planned mass construction of healthful low-cost housing, most of Brazil's labor problem was indeed solved.

Block construction, as such, followed the simple, basic rules suggested in the fourteen steps* which perfectly illustrate the simplicity of this construction method.

Executing this construction method, however, was vastly different from our own practice, both past and present.

To save much precious time, improve each workman's job and cut construction cost by saving construction time, we broke down operations on concrete block construction jobs, from laying out the plot to placing precast concrete roofing tile on the finished building.

*For enlargements and reprints of these fourteen points, address the Portland Cement Association, 33 W. Grand Avenue, Chicago, Ill.



• These photographs show different stages in the mass construction of concrete block houses in Brazil.

For each basic performance, such as digging foundation trench, laying foundation block, casting floor slab,

• The first step in roofing over a concrete block house in Brazil.

and so on, trained specialists went to work to perform routine work perfectly, in record time.

In this fashion, whole streets of houses grew out of bare grounds, as if by magic.

Mass construction of low-cost concrete block houses is nothing new in our own country. Two factors, however, have prevented our National Housing Program from using this perfect building material more extensively, namely:

1. Too much badly made block turned out by careless manufacturers. There is no block machine so cheap and so simple that one could not make good block on it by using care and following a few simple rules. (See "How to Make Good Concrete Block, PIT AND QUARRY, October, 1945.)

2. Our methods of laying block are those practiced by the Egyptian builders 3,000 years ago.

With prefabricated metal window and door sash and many other facilities of modern floor and roof construction methods, we have been wasting much time and money by chasing after complicated and costly prefab construction methods, while simple hollow concrete block has been available so readily all the time.

Concrete Masonry

(*From page* 198)

land Cement Association, was appointed in mid-year as full-time director of engineering for N. C. M. A. Mr. Copeland spends about half his time in the field, visiting the plants of member companies in all sections of the country.

The association's 1947 annual meeting and exhibit, scheduled for February 17-20 at the Hotel Sherman in Chicago, promised to be the largest gathering in its history, and it was already assured that there would be far more exhibits than at any previous meeting.

The new year could hardly fail to be a good one for the concrete masonry industry in general. With the continued high demand for residential construction, the 1947 operations of the industry could scarcely drop much below the 1946 level, unless too many producers continued to regard customers as rather troublesome people who demand too much.

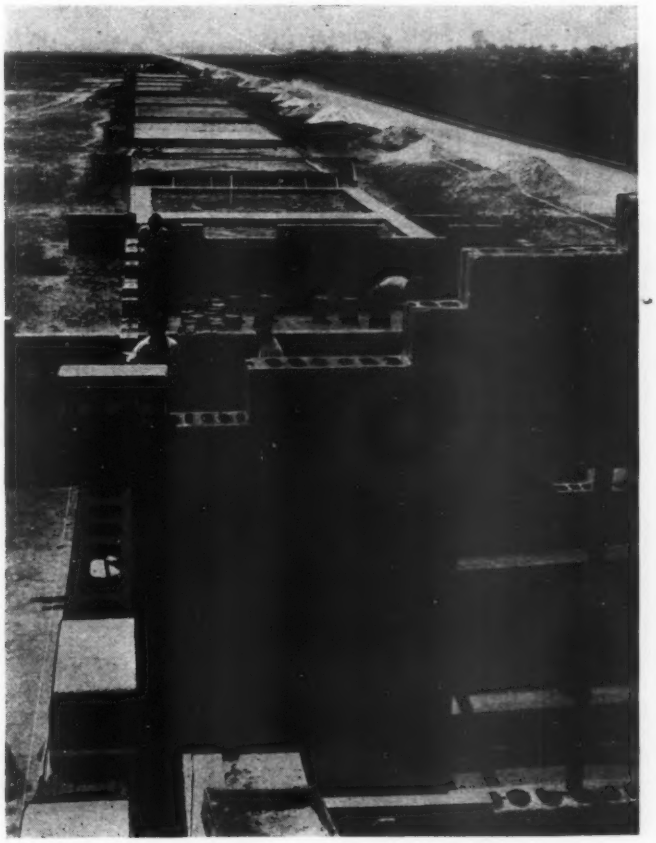
Concrete Pipe

(*From page* 201)

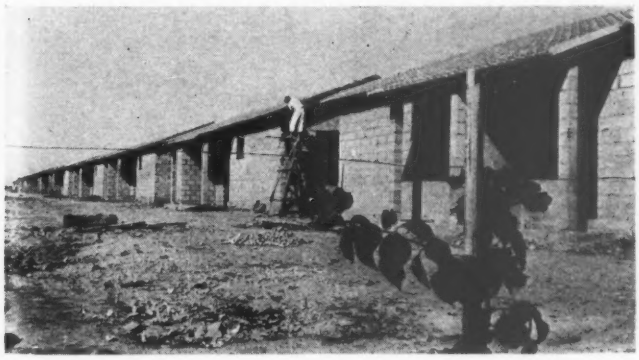
characteristics. It is understood that vacuum processing makes it possible to strip forms within 30 minutes when high-early-strength cement is used.

The industry was looking forward to the 39th annual convention of the American Concrete Pipe Association, scheduled for February 24 to 26 at the Hotel Statler in St. Louis. Prospects for the industry in 1947, particularly with respect to large-scale public works programs, were slated for thorough discussion during the three-day meeting.

The 1947 meeting would mark an important milestone in the association's activities, for it would be just 40 years since the industry held its first meeting at Emmetsburg, Iowa, in April, 1907. Under the able leadership of its managing director, Howard F. Peckworth, the association was playing a more active role in the affairs of the industry than ever before.



• Above: A completed concrete block house in one of the Brazilian projects.
• Right: A row of houses in different stages of construction.
• Below: A housing unit nearing completion, before landscaping.

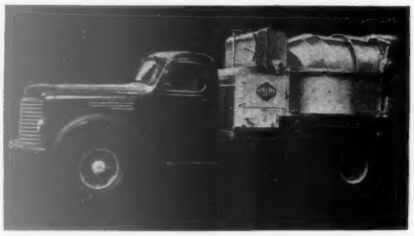


NEW MACHINERY and SUPPLIES

● Truck Mixer

Substantial improvements in the design and construction of "Smith-Mobile" truck mixers are announced by The T. L. Smith Company, Milwaukee, Wis., concrete mixer manufacturers since 1900, and originators of the high-discharge type of truck mixer.

Smith-Mobiles coming off the assembly line will have larger drums with increased capacities and will include such refinements as selective dual water injection system for job mixing or mixing in transit; fully enclosed water pump valve and piping within motor housing to afford complete protection in cold weather; syphon type water tank equipped with a single lever-operated, Poppet-type, three-way valve; self-adjusting metal sealing door which automatically compensates for wear; improved three-point suspended transmission assembly with rubber mounting for bearing and gear case; Timken-bearing-equipped front drum support; quickly accessible clutches; complete streamlined enclosure for greater safety.



Increased capacity.

Although these improved Smith-Mobiles have larger drums that conform to the new N.R.M.C.A. standards, as well as thicker drum shell and blades, improved design and functional styling have made it possible to lower the weight per cubic foot of drum volume.

● Rotary Block Maker

The "Hi-Production" concrete block machine, designed and built by Henry and Hutchinson, Inc., Blair Building, Decatur, Ga., is entirely automatic in operation and requires no attention from the operator.

The machine consists of a rotary table on which are mounted five equally-spaced mold boxes. Each box contains two 8- by 8- by 16-inch mold boxes, so that each complete turn of the table produces ten blocks. During the period of rotation of the table, four operations are performed at four stations on the perimeter. The table moves in a counter-clockwise direction, when viewed from above.

At station No. 1 are located a hopper, a charging mechanism and a vibrator. At station No. 2 the block is compressed and formed to size by two large air cylinders. The forming pressure is readily adjusted from zero to 12,000 pounds to best suit the particular block being made and the aggregate used. At station No. 3 the blocks are stripped from the mold by a hydraulic cylinder, and removed from the machine by an off-bearer which is either manually or automatically operated. The automatic type utilizes a conveyor to deliver the blocks to the door of the curing room. At station No. 4 the pallets are replaced in the mold box. This may be done either automatically or manually, as desired.

The movement of all operating parts is controlled by electricity. The machine is easily set at the most efficient speed by means of a small dial controlling an electronic timer. Safety devices are incorporated in the machine to prevent accidents, and to insure that all parts are clear before the table turns to the next station.

Blocks of varying densities can be produced by controlling the concrete mixture, length of vibration time and the pressure exerted by the forming cylinders at station No. 2. Due to the efficient method of vibration the machine will produce blocks that will greatly exceed building code requirements, not only in strength, but also in density and appearance.

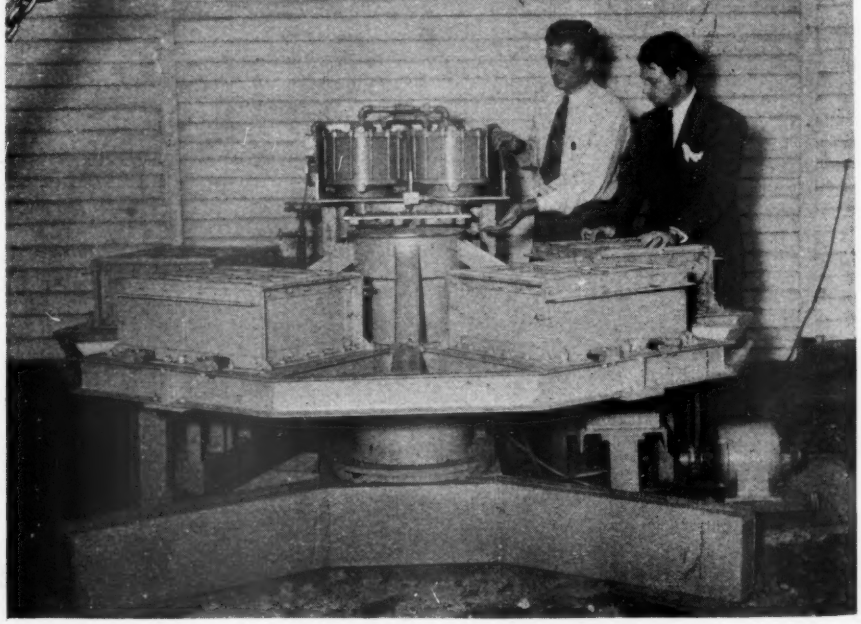
The entire machine is sturdily constructed of welded steel. Wear of the few moving parts is kept low by automatic lubrication. No rotating cams, gears or other complicated mechanical mechanisms are used. In line with the principle of keeping wear at a low point, the mold boxes are lined with replaceable ¼-inch steel armor plate.

The machine is powered by a 140 cubic foot compressor, which supplies air at 150 p.s.i.

● Block Machine

The Blatt "Universal Controlled Oscillation" block machine was designed to give the average operator a machine that would make every kind of popular block in both the two-core and three-core styles. It is easy and quick to change over, has few parts, and is built with a ball-bearing mounted hopper.

A semi-automatic switch starts the motor when the feeding hopper is



Entirely automatic, electrically controlled.

Modular Coordination

Cored Steel Pallets
For the Modular Type Block

"Commercial" is first with Pallets for the Modular Size Blocks — Same strong construction and heavy gauge steel. Compare ours with other steel pallets before you buy—

Modular Size Catalog Ready

THE COMMERCIAL SHEARING AND STAMPING CO.
YOUNGSTOWN, OHIO

PRODUCTION LINE METHODS SPEEDS MONEY MAKING MACHINES TO YOU

Put a Graveley to work today. One Better Built machine, 2 or 3 cells, makes eight sizes of blocks. 2 Graveley machines operating from a single mixer and conveyor will produce well over 3,200 blocks a day.

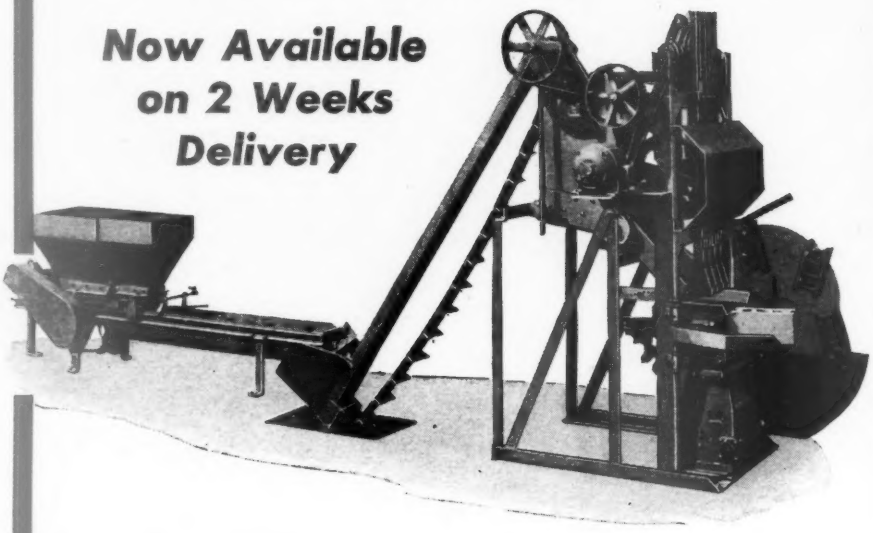
Write, wire or phone

BOB GRAVELEY INDUSTRIES, INC.
ORLANDO, FLORIDA

COMPLETE KENT PLANTS

TO PRODUCE 1000 BLOCKS AND UP PER 8 HOUR DAY

Now Available on 2 Weeks Delivery



IMPROVEMENTS in the material situation and increased manufacturing efficiency permit us to make this unusual delivery.

Buy this complete *motorized KENT plant. Install the various coordinated machines in compact space guided by the simple and explicit instructions furnished. Everything needed is included.

Then you will be ready to make concrete products with equipment that has a record for practical and profitable production in plants throughout the country.

At less than the usual manpower cost the KENT *Continuous Mixer delivers well-mixed concrete in a steady stream to the KENT Elevator which raises it to the KENT Feeder. From this the concrete flows into the easily operating KENT Stripper. The pull of a lever brings the KENT Tamper into operation for speedy tamping of dense block. The lever-operated hopper "strikes-off" the blocks smoothly. It is then raised by an easily operated lever and swung to one side on the "off-bearer".

You Are Invited To Visit Our Exhibit at the
1947 CONCRETE INDUSTRIES EXHIBITION —
Hotel Sherman, Chicago, Ill. Feb. 17-18-19-20.

*Larger KENT plants are available; also units for belt drive and combinations having the KENT Batch Mixer, instead of the Continuous Mixer. Use the coupon below to obtain any desired information quickly and easily.

The KENT MACHINE COMPANY
Manufacturers of CONCRETE PRODUCTS MACHINERY Since 1925
CUYAHOGA FALLS, OHIO, U.S.A.

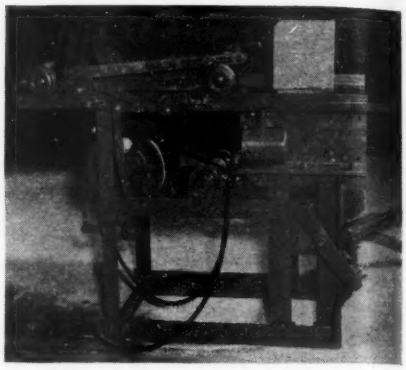
Send complete information and prices as checked below.

☐ Plant illustrated above ☐ Plant with Batch Mixer
☐ Plant with belt drive ☐ Larger Complete Plants

Name ..... Address .....

P. & Q. City .....

brought forward into the loading position, so that it is oscillating at the time the material is raked into the mold box. The switch is then shut off by hand, which automatically sets the brake on



Controlled oscillation.

the motor to stop the oscillation so that the cores are motionless when the top of the block is struck off by the hopper. If the operator wishes to use a troweling action on the top of the block by making three or four short strokes with the hopper, it is possible to do so without interfering with the brake. The machine is designed to make standard one-, two- and three-core blocks, and half blocks. It is also possible to make any of these sizes at various heights, and to make the three-core block in either the square or open-end style. Operators should contact the Frank I. Blatt Sales Co., Inc., Rattlesnake, Fla., for information.

CONCRETE BLOCK *Manufacturers*

IMMEDIATE DELIVERY ON JAY-BEE MIXERS!

MOTOR INCLUDED!

Rugged construction! Twin spiral mixing blades! High quality steel cut gears! Regulated discharge! Visible mixing! Job-tested design! 12 to 24 cu. ft. sizes. Other sizes to your specifications. ORDER NOW!

J. B. HUNT & SONS
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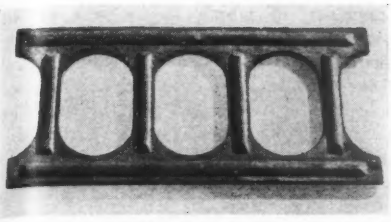
Write for Details and Price List Today!



Pictured above is a concrete block pallet made of magnesium alloy. They are made to order from patterns supplied either by the customer, or the manufacturer, Magnesium Alloys, 904 N. 27th St., Boise, Idaho. Pipe pallets are also available in this magnesium alloy, which is 80 percent lighter than grey iron.

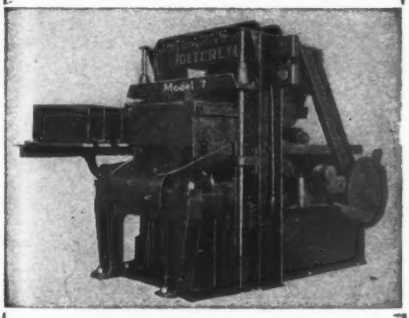
• Block Conveyor

Concrete blocks can be handled by the Haiss Medium-Duty Cargo Conveyor, which has a 16-inch belt and sideboards to prevent spillage. A heavy-duty model with a 30-inch belt is also available. Made by the George Haiss Manufacturing Company, Inc., 391 Canal Place, New York 51, N. Y., these conveyors will move a load upward at a slope as high as 30 degrees, at a normal operating speed of 80 f.p.m.

Motor drive is by high-grade roller-chain over precision-machined steel sprockets. For non-electrified installations, a four-cylinder gasoline engine machine is furnished.

A rachet winch multiples the leverage applied to raise the weight of the boom. The tubular steel uprights are drilled

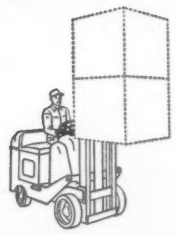
The Vibration Machine Supreme



Vibration under pressure — 7,200 blows per minute—and ruggedly built to give long life, the Joltcrete machine is the choice of the wise concrete-products operator. Produces clean-cut, high strength units in any size, and gets the most out of a bag of cement. Built in three sizes with capacities of 7 to 9 standard units per minute.

Stearns Clipper Stripper Machines; Stearns Joltcrete Machines; Stearns Mixers; Cast iron and Press Steel pallets. Straublox oscillating Attachments, etc. Repair parts for: Anchor, Stearns, Blystone Mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Frisl, Manager **Columbus, Ohio**



HOW TO RUN CIRCLES AROUND COMPETITION

In most plants, handling costs are too high. Reduce handling costs and you reduce production costs . . . reduce production costs and you increase profit margins . . . and increased profit margins always give you a head start on competition.

Let's go back to the beginning: You can reduce handling costs to a minimum with a Towmotor Fork Lift Truck, designed for 24-hour, full-power service . . . lifting, transporting and stacking all types of materials and products throughout production and distribution.

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TOWMOTOR *THE ONE-MAN-GANG* **FORK LIFT TRUCKS *and* TRACTORS**

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

• Moves load 80 f.p.m. up 30 degree slope.

for bolts on which the weight of the boom is carried after the height setting has been adjusted. For use where lateral movement is desired, a knuckle jointed axle can be substituted and the swiveling action of the wheels used. Either all-steel or pneumatic automotive-type wheels can be furnished.

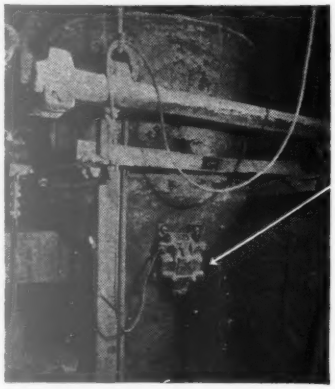
TRADE NOTES

The E. L. Rahm Company, 720 South Michigan Boulevard, Chicago, has announced the opening of a new Chicago plant which will add 45,000 square feet of floor space to present production facilities. The expansion will increase the production of Turesco Waterproof Masonry Paint from 3,000 to 40,000 gallons per day and of Turesco Plasticizer from 500 to 2,000 gallons per day.

Julien R. Steelman of the Koehring Company, Milwaukee, has been elected chairman of the Mixer Manufacturers' Bureau for 1947, to succeed G. K. Viall of the Chain Belt Company.

The action was taken at the annual convention of the bureau on November 6. Members who attended heard reports of greatly improved production.

New quarters for the Calcium Chloride Association are located at 1028 Connecticut Avenue, N.W., Washington 60, D. C.



Whether On
little hoppers
or BIG BINS

SYNTRON
"Pulsating Magnet"

ELECTRIC VIBRATORS

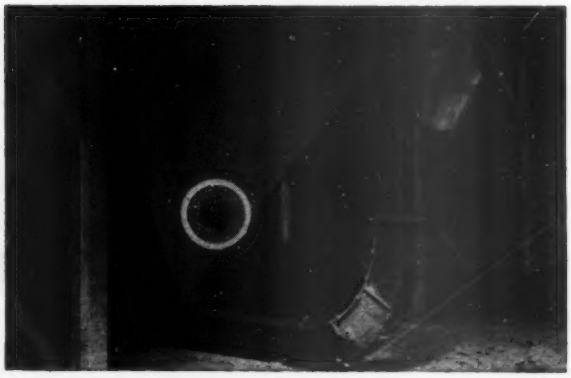
will keep them Open — and FREE-FLOWING

3600 powerful, pulsating vibrations per minute penetrate the mass of material — break down arching and plugging — and eliminate pounding and sledging.

Manual control — or automatic control by hopper gate action — ON when the gate is open, OFF when the gate is closed.

Descriptive literature available — or send us a dimensional sketch of your troublesome hopper, giving the gauge of walls. We'll be glad to recommend the proper model.

SYNTRON CO.
385 Carson Homer City, Pa.



PRODUCES
28 BRICKS PER MINUTE
VI-BRIK-CRETE
NEW HOPPER SPEEDS MOLDING

• MODERATE INITIAL INVESTMENT
• 60 VIBRATIONS PER SECOND
• LOW PRODUCTION COST
• FOR QUALITY CONCRETE BRICKS
• EASY TO OPERATE
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EAST HOFFMAN ST.
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PIT AND QUARRY

CONCRETE MANUFACTURER

PATENTS!
Manufactured under Gelbman and other patents. Infringers will be prosecuted.

Part of Cleveland Builders' Supply Co. plant, Cleveland, Ohio

12,500,000!

— that's the number of quality 8" equivalent block

produced by *ONE* Stearns Joltcrete

This machine, shown above, left, purchased in 1940 by the Cleveland Builders' Supply Co., is still going strong—well on its way toward 13,000,000 block.

***Maintenance costs* during this period have not exceeded *1/20 of a cent per block!* — and the machine costs less than $9500.00. What — other than Joltcrete — gives so much for so little? In 1946 the four No. 9 Joltcrete machines operating in this plant produced more than 10,000,000 8x8x16 in. block or their equivalent. This is believed to be the largest production of any plant in America.**

These figures, supplied by Jay Ehle, production manager of the company, should answer the question, *"How good is a Joltcrete?"*

ASK ANY OWNER!

Write today for literature describing the outstanding features of this machine that produced from 9 to 11 quality 8 in. units per minute.

STEARNS
GENE OLSEN, PRESIDENT

Manufacturers of vibration and tamping-type blockmakers . . . Mixers . . . Skip Loaders . . . Yardhoists.